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THE PRESENT STATE OF PSYCHOLOGY AND ITS RELATIONS TO THE NEIGHBORING SCIENCES.[1]

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I.

To-day we have arrived at the conviction, that though the great and complex totality, which we call reality, cannot be understood without more or less artificial isolation of elements and without an analytical investigation of the mutual relations of such elements, yet the elements, which our science so distinguishes, are not to be considered as the constituent elements of the reality itself. In other words: the conditions of knowledge and of existence are not the same. Our ways of understanding are not necessarily the ways nature follows in her production. This is the old fundamental thought of critical philosophy, which has slowly made its way, especially during the later years, not only among philosophers, but also among naturalists who have discussed the first principles of their science. Then the possibility appears of an irrational relation between thought and reality, — the possibility, that the analysis of thought cannot do justice to the great synthesis of reality. The validity of science does not suffer by this, because the analyses and distinctions, which we undertake in order to arrive at a scientific understanding, ought to be founded, point by point, in observations of the living and concrete reality.

[1] Address delivered at the Congress of Arts and Sciences, St. Louis, September, 1904.

In no domain of experience does this point stand out so clearly as in psychology. In the material world, the elements which we distinguish have their position in space, one outside another, though an interaction is supposed to exist between them. But such an external relation cannot be valid in the domain of mental life. Here, the single element is so woven into the whole that its very character is determined by it, and the whole is here not to be considered as a mere product of the elements. In psychology, analysis and distinction have a more artificial character than in physical science. We have less right still to consider mental elements as absolute realities, than to look at material atoms in this way. However, there is no other way to scientific understanding of mental life than analysis on the basis of observation and experiment. And at its first beginnings, as at its limits, mental life has a sporadic character, presents itself, at least apparently, as isolated sensations, so showing a great contrast to the character of totality and synthesis, which it has where it appears in full development and maturity. We have here an antinomy which is of great importance to all psychological research. We cannot explain mental life as a mere product of the elements distinguished by the analysis, neither as a product of the sporadic flashes, to which it seems to be reduced at its limits; and yet the elements, to which the analysis and the observation of limits conduct us, cannot but bear an inward relation to the concrete consciousness and its synthetic totality.

This antinomy has had a great influence on the development of psychology. It manifests itself especially in the struggle between the two great schools, the one founded by Hartley and Hume and continued in the association-psychology and the Herbartian school, the other founded by Leibniz and Kant and continued in the idealistical school of Germany. The first school leads to a mental atomism, while the other maintains the synthetic character of mental life. I am not going to follow up the history of this struggle in its particulars. There is no psychologist, whose general standpoint and special views are not determined by his position as regards the relation between atomism and synthesis in the domain of mental life. There is a

temptation to dogmatize on both sides. They may each consider its particular point of view as an absolute and all embracing one.

There is a psychological atomism which looks at the elements of psychological analysis as absolute and real parts, mechanical composition of which produces the mental life. It forgets that the whole psychological problem begins anew in every mental atom. For as in physical science the atoms, which seemed to be absolute, turned out to be worlds apart, in the interior of which movements take place and currents go on, so we are led to acknowledge that our simplest sensations are synthetic phenomena, concrete totalities, corresponding to more or less complex physiological processes.

On the other hand, there is a dogmatism, which looks at mental life as an undivisible unity, perhaps a substantial unity, which defies all analysis. It forgets that mental life, as indeed all life, exists under a perpetual struggle against internal and external oppositions, and that even practical introspection discovers important points of difference; for instance, at every choosing between possibilities. Different dispositions and tendencies manifest themselves in consciousness. The points of difference, then, are not called forth by scientific observation and analysis, but they belong to life itself. As scientific analysis by its one-sidedness always forces us to return to the great synthesis of life, so on the other hand, we are forced by the internal tension of life to acknowledge the reality of differences and oppositions and so far to verify the results of scientific analysis. Only what life has connected, can be analyzed by us; but this connection does not exclude differences between the elements of life.

In American literature the relation between analysis and synthesis in psychology has been energetically investigated by such eminent thinkers as William James and Hugo Münsterberg. I believe that the last-mentioned thinker has been led to put up a stronger contrast between psychology and life than it is possible to maintain. It is always life which gives to psychology its materials, and introspection does not begin in scientific analysis, but is a practical necessity which presupposes the existence of points of real difference within the totality of life.

The contrast between analysis and synthesis in the domain of psychology has to a certain point an affinity with the contrast between intellectualism and voluntarism. In the domain of sensations and ideas the distinction between elements can be made with the least difficulty. It is the most articulated side of mental life, and at the same time the side which is most open to observation and experiment. The life of emotion and will shows a greater concentration, and the synthetical character here shows itself more clearly. The over-valueing of the results of the analytical method very naturally lead one to undervalue the importance of emotional and volitional life, and even perhaps to look at emotions and will as mere resultants of sensations and ideas. But it is impossible to deduce the mental concentration from the interaction of absolute elements, and the whole direction of the development of sensations and ideas is determined by the interests, values and aims, which have their foundation and find their expression in emotional and volitional life. The voluntarism, which was founded by Fichte and Schopenhauer and has important support in the biological theory of the struggle for life, is more and more considered as the main point of view in psychology.

II.

Both the incommensurability between analysis and synthesis, and the superiority of voluntarism compared with intellectualism ought to diminish the propensity to close once for all the conception of personality, as theology and speculative philosophy have often tried to do. Positivism and empirical philosophy are often accused of abnegating the conception of personality, and in our time the historical view and the theory of liberty are often contrasted with empirical psychology. But even the empirical, experimental and analytical school of psychology presupposes an energetic and earnest recognition of the reality of personal life. This school is founded on the conviction, that the value of mental life is not to be diminished by being bound to certain conditions and subjected to certain laws. It studies then, with confidence, mental life in all ways which are open to science.

The difference between the psychological schools depends on where the problem is found, and how the burden of proof is distributed. Is the riddle of psychology how unity and continuity in mind are possible, or does the riddle arise, when consciousness appears in a sporadic manner, in isolated flashes? That is the main question. But it branches out into many particular questions. The task of the synthetic school is to find the special forms of unity and continuity, which cannot be deduced *a priori*, and then to explain, how it is possible, that mental life in certain cases can have a sporadic character. The task of the other school is to describe the particular forms and degrees of isolation, and then to explain, how there can be unity and continuity in mental life. Every school of psychology ought to admit, that so long as mental life persists, a perpetual struggle is going on between the synthetic and the sporadic tendencies. When the character of unity prevails, the problem is, whether this unity is a mechanical aggregate, or whether it has a deeper foundation.

Pathological psychology seems to me decidedly to prove the truth of the synthetic conception. Without continual mental labor the 'psychological tension' (to use the expression of M. Pierre Janet) cannot be sustained; and in mental disease this tension, without which consciousness cannot unite within itself a varied content of different elements, can only be maintained with great and painful effort; very strong influences are then necessary, if division or slackness are not to be the results. Isolated and sporadic phenomena are always setting mental energy a task.

The conception of mental energy can, as all conceptions of energy, only be defined by the labor which is performed, the resistance which is conquered. There is so much more mental labor to be performed, the more elements or tendencies there are that have to be united in the same mental state; the more different these elements or tendencies are, the stronger each of them is, the more intimately they are to be united, and the more remote in time they are from one another and from the present moment. It is true, that in the individual cases it will be a matter of no little difficulty to apply that concept of psy-

chical energy, whose possibility here appears. The true factors of psychical energy can only be determined by careful observation and all-sided knowledge of the special historical and individual conditions in each single case. The number of elements or tendencies, the degree of their difference, the intensity of each one of them, the intimacy of their connection, the degrees of their distance in time, all this it is difficult to point out with certainty, and all five vary from case to case. To all this is yet to be added the velocity with which the mental function of synthesis is to be performed. We do not here have such simple factors as mass and velocity, by which physical energy is determined.

An inexhaustible wealth of possibilities is conditioned by the very different ways and degrees in which these five separate circumstances may appear. There is here a great field for observation, experiment and comparison. The comparative psychology of individuality is as yet in an elementary state. Only in the domain of psychology of religion, especially here in America, a movement has begun in this direction. But no theory can ever give an exhaustive description of the manner in which the different elements or tendencies work together in any single state of a single individual. Here, as everywhere, the perfect individualization is to be attained by art, not by science. Art only can give a synthesis, which in some measure can do justice to the great synthesis of life.

III.

New problems arise when we try to characterize the relation of psychology to the neighbouring sciences. Psychology has a special relation, on one side to physical, and on the other side to historical and ethical science. And the relation can be briefly said to be, that in comparison with physical science psychology has a decidedly synthetic character, but in comparison with historical and ethical science a decidedly analytical character. By these contrasts the problems which arise at the limits of the different sciences are determined.

I have already mentioned that the simplest mental elements which we can distinguish correspond to very complex physio-

logical processes. What psychologically appears quite simple is a physiological multiplicity. In a simple mental element must be combined what physiologically covers several moments and a whole region of the brain. But there is also another thing which is of importance here. Mental elements are qualitatively different one from another, while we have reason to believe that the correspondent processes in the brain are only different as regards intensity, direction and combination. What psychologically appears as differences of quality is from the point of view of physical science to be regarded as differences of quantity. Continuity, then, is more easily demonstrated from the physical than from the psychological point of view. The old maxim that nature does not move in bounds cannot be carried out in psychology as entirely as in physical science.

From these circumstances some thinkers have concluded that a science treating of mental life is only possible, if for the relation between mental states we can substitute the relation between the corresponding states of the brain. In order to be a science, psychology must be transformed into physiology. If not, it should, according to these philosophers, be impossible to approach the ideal of scientific understanding, *i. e.*, the pointing out of continuity and equivalence between phenomena. But we always begin by discovering causal relations between qualitatively different phenomena, and not till later on can we take up the task of substituting for this elementary causality a more perfect causal relation with continuity and equivalence between the phenomena. Though in the domain of psychology we are scarcely able to go further than to the elementary causality, because we have no mental units and so no thorough quantitative methods, yet this fact does not exclude the right to admit a causal relation between mental states. And this is not only a right, but also a necessity. If there exists a causal relation between the correspondent processes of the brain, there must also be at least an indirect causal relation between the mental states. Moreover, we have only quite schematical constructions of the corresponding processes of the brain, constructions which are based on analogy with the directly observed and analyzed mental states. From these states we draw our conclusions as to the

logical processes in the brain. This conclusion can not be true, if psychological observations and analysis are not correct. The independence of psychology is thus presupposed.

Perhaps the simplicity and the qualitative character of the mental elements are to be regarded as the results of a hidden synthesis, so that if we could penetrate more deeply into the sphere of mental differentials, for instance, to differentials of the second or the third order, the whole problem would stand in a clearer light to us. But we should always here meet at last the great problem of the relation of mind and matter. Here, also, the contrast between analysis and synthesis becomes important. The difference which can be established between mind and matter is due to analysis, to a distinction of elements, which in reality exist in connection with one another. We break the real totality, and afterwards we are astonished, because it is difficult to unite the parts into which we have divided it. This point has been very well cleared up by Wilhelm Wundt and Roberto Ardigo. The reality is always the great fundamental synthesis, within which we move with all our abstractions and analyses. It is a full unbroken melody, compared with our laborious spelling. But there is no other way to knowledge than the one which begins with analyzing. Our attention proceeds from point to point, and only later on tries to unite its single results. And as little as we ought to ascribe absolute validity to our distinctions, so little ought we to regard it as fortuitous, that our seeking after knowledge necessitates just these special distinctions. It is one of the characteristics of reality, that it can only be comprehended by careful analysis of its contents.

I am not here going to discuss the hypotheses of the relation of mind and brain. I shall only say that as the physiology of the processes of the brain do not depend on other methods or points of view than those of physical science in general, the duty of proving is incumbent upon him who maintains an encroachment of the mind on the physiological processes. Such a supposition would do away with the independence of physiology. But there is no reason to deviate from the principle which physical science has followed for centuries, and to which all its tri-

umphs are due, namely, that material phenomena are to be explained by material causes. Even to-day the dictum of Spinoza is valid: 'When men say that this or that action of the body springs from the mind, they do not know what they say, and they do nothing but confess that they know nothing about the cause of the action.' The only working hypothesis which makes possible a coöperation between physiology and psychology without any encroachment from either side, regards the relation of mind and matter as a functional relation, in the mathematical sense of the word, and tries to find as much continuity within both series of phenomena as possible. A final metaphysical interpretation is still an open question, but psychology as such has nothing to do with it. The parallelism, or, as I prefer to call it, the hypothesis of identity, has mostly been assailed as a metaphysical hypothesis. But it is first of all a working hypothesis, and the only one which can be followed up in all its consequences in the present state of science. And as I have said of our analyses and of our distinctions, so I now say of our working hypotheses: we have no right to regard it as a mere accident, that the world can only be exactly known if we apply just these working hypotheses. A system of metaphysics which would construct a view of the world without any regard to the working hypotheses which have been necessary, would be of no philosophical value.

IV.

As psychology is synthetical as compared with physical science, so it is analytical as compared with historical and ethical science. Historical science treats of human works, ethical science of human ideals, but psychology treats of the elements and of the general laws of mental life. The relation of psychology to historical and ethical science is dependent on the relation between elements and works and ideals. There are here three lines of thought which may develop side by side. They all draw from the same deep source: from the immediate and spontaneous mental life, the real and concrete life, which no analysis can exhaust, and which can never be expressed completely in any work or any ideal, as little as in any sum of elements. All research has here as its subject the infinitely con-

crete totality, and tries from different points to describe its nature and to express its fullness in definite forms. But the tones of life are so manifold and lie so close together, that no scientific notation can express them completely. This is as true with regard to historical and ethical science as with regard to mental science. But within this identical position there is an interaction between mental, historical and ethical science. If we want to find out the elements and laws of mental life it is not enough to study the single individual in its special states. A study is also required of human works and ideals, in which the nature of mental life is revealed throughout the ages. There exists no mental life in general. It appears in different forms at different times and places, and it strives to develop itself as fully as possible in every one of these forms, though the totality of its elements has a different timbre in every special case. Here psychology has a large amount of material for its analysis. The sociological method in psychology works side by side with the introspective, the experimental and the physiological methods. Mental science has a more abstract character than historical and ethical science, because elements are more abstract than works and ideals. Psychology here ought to apply the inversely deductive method, as it has been already applied by Comte and described by Stuart Mill.

The first step is to point out the process which has led to the rise of a work or of an ideal; the second is to deduce and explain this process from general laws of the interaction of mental elements. By pure deduction no results can here be arrived at. Reduction, not deduction, is what we can use. This is not only the relation of psychology to the historical and ethical sciences, but also to art — to the art of education, to the fine arts, and to the great art of ethical life. We cannot deduce pedagogics, æsthetics and practical ethics from psychology. But we can observe the spontaneous development of the art of education, of æsthetic production and of ethical life, and the ideals and points of view which are revealed in this development may be understood by the help of general psychological laws. And this is after all also the relation of psychology to the theory of knowledge and to the philosophy of religion. It has to show the

psychological possibility of the forms of thought which are presupposed in scientific knowledge. And it has to analyze the mental experiences of religious life. As to this last point I have expressed myself in the following manner in my *Philosophy of Religion:* "In Religion men have made some of their deepest and most intensive mental experiences. If religion is genuine and original, all the elements of mental life are at work in it with an energy and interplay not to be found in any other domain. The study of religious life is therefore of great importance to general psychology." Lastly, a reciprocal relation will more strongly establish itself here, so that the understanding of mental elements and of the laws of their activity will be able to guide and clear up the work in the special domains. Indeed, the history of these domains shows that directly or indirectly such an influence has always manifested itself. If psychology is to have a future, this influence will be still more important than it has hitherto been. Psychology stands in a great debt to its neighboring sciences, and to the different kinds of art. Let us hope, that it may be able to pay a part of the debt, though this debt ought always to be contracted again, if psychology, as well as the other sciences, is to make progress!

COMPARATIVE AND GENETIC PSYCHOLOGY.[1]

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The central purpose of this congress is the unification of knowledge, and the discussion of those general principles and fundamental conceptions which underlie the related problems of allied sciences. Now comparative and genetic psychology takes its place between biology, on the one hand, with its doctrine of variation and elimination, with its organic values in terms of survival, and, on the other hand, such normative sciences as ethics and æsthetics, with their doctrines of worth for the ideal life of man. In any case the starting point is in close touch with purely biological reactions, and the goal is our systems of knowledge and our ethical conceptions. And the fundamental principle underlying and giving unity to these departments of study, in their genetic and strictly scientific aspect, is evolution.

It may be well at the outset to state that the province of comparative and genetic psychology, as I conceive it, is to investigate the nature and mode of development of mental processes, dealing with them in their synthetic rather than their analytic aspect, at any rate employing the methods of comparison and analysis with a predominantly synthetic aim and in such wise as to enable us to reach general principles which may be applied to the elucidation of particular cases. Incidentally it may have occasion to classify mental products, to distinguish and group certain modes of instinctive behavior, to mark off from each sundry other types of association, and so forth; but it only does so in strict subservience to its central aim and object. That aim is explanatory rather than descriptive. Every piece of comparative and genetic work should be so planned as to contribute something to the establishment or the support of the principles of psychology. It should add fresh ideas to the ideal con-

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struction of the science. Only on these terms can we claim, and shall we receive, the cordial recognition of those who are working in other fields of psychological research — on these terms and as a matter of course, on those of constant and faithful appeal to the facts of observation and a rigid adherence to the canons of scientific interpretation. If we undertake our work in this spirit and with no narrower aim, the whole psychological brotherhood will gladly admit that such research is indispensable and of lasting value. In any case it should be our aim, in this section, to contribute to the basal principles of psychology by employing comprehensively the comparative method, and by special enquiries in the field of development and evolution.

My own studies, as some of my hearers may know, have lain in close relation to certain aspects of biological investigation, and I may perhaps assume that I shall be expected to respond to the honor done me by the invitation to speak on this occasion, by indicating in broad outlines some of the conclusions to which I have been led in so far as they bear upon psychological genesis. If then I be asked to give expression to one or two of the most salient points which strike one who approaches psychology from the biological side as of cardinal importance, I should perhaps place first and foremost as genetically fundamental the way in which, in the lower ranges of mental development and evolution, everything hinges on practical behavior and activity. Psychological process is indeed a middle term between the results of complex stimuli from the environment on the one hand, and the results of complex reactions to that environment on the other hand. But in the earlier stages of genetic process this middle term is wholly subservient to the practical needs of an eminently active and practical life. It does not attain a position of relative independence. It is never divorced from its natural outcome in behavior. It does not assume that peculiar and, from the purely biological standpoint, abnormal preëminence which it is apt to assume in the treatment of a predominantly intellectualist psychology of the earlier school founded mainly on the mental processes and products of philosophers and sages.

A second point which comparative and genetic study brings

out with almost equal clearness is the complexity of the biological foundations on which the beginnings of the psychology of the individual are laid, and the consequent fact that, in individual genesis, the initial data are already-grouped wholes and not sporadic and isolated sensation-elements. One of the problems which the earlier psychology essayed to solve is by what process of coalescence and elaboration isolated sensations could build themselves up into the complex wholes of perception and how these could relate themselves with the similarly-built complex wholes presented to consciousness when active movements were carried out. It assumed that the several sensations which may be distinguished through the application of a difficult and prolonged process of analysis and abstraction, were independent psychological units separately given, and sought to render an account of the manner in which these mental elements threaded themselves on the strands of association. A biological treatment has more and more clearly tended to emphasize the fact that the individual organism comes into the world as a going concern the recipient of groups of stimuli giving psychological net-results, on the one hand, and capable, on the other hand, on purely organic grounds, of complex modes of behavior which supply also their net-results, the two sets of net-results, coalescing so as to constitute felt unity-wholes. It has thus tended to relegate many of the problems of mental ontogenesis to biology, and has come to regard association itself as in large degree dependent on factors which are primarily organic and physiological.

If this be so, the starting point of genetic study lies in the borderland region where distinctively biological evolution passes up into, and is increasingly influenced by, psychological development. And for this reason many observers have selected the phenomena of instinct as most likely to throw light upon some of the lower phases of psychogenesis.

From the phylogenetic point of view we are at present, I fear, very much in the dark as to the earliest stages in the evolution of effective consciousness as capable of exercising, in association with its physiological concomitants, guidance in the course of behavior. By effective consciousness I mean that

which does, in some way, control organic activities. The only criterion we have of its presence is the observable fact that the organism profits by individual experience. It is, I admit, a difficult criterion to apply. But I confess that I am disposed to regard the introduction of consciousness into an ideal scheme of explanation without the application of some such criterion — the introduction it would sometimes seem of a sort of consciousness which is not a mode of experience — as a bit of mythology, which is harmful rather than helpful. Of effective consciousness, however, having demonstrably a guiding value, there is no evidence in plants. Dr. Jennings finds little or no sign of it in the lower Infusoria; nor can Dr. Yerkes find much or any proof of its presence in the Medusa. This is the region of tropisms and chemism and the like. Just when and how effective consciousness first comes into play we are, as yet, scarcely in a position to determine. Hence the problem has to be attacked in the main ontogenetically, by considering the connection between automatic behavior and that which affords evidence of conscious control, in organisms which exhibit both, each in relation to the other.

If there is one feature which is essentially characteristic of the popular conception of the influence of mind in the conduct of affairs, it is that effective consciousness is a controlling influence standing in some way apart from the organic happenings over which its control is exercised. Is this popular conception wholly without scientific foundation and erroneous, as some physiologists would assure us? Take any simple case of accommodation to circumstances through a modification of behavior due to pleasureable or painful experience in like cases — let us say the avoidance of nauseous insects by young birds — or any other example of the intelligent control of instinctive procedure. Can we conceive how the feeling-tone, as the concomitant of nervous processes involved in the instinctive procedure as such, could modify the direction of the discharge — could either augment or inhibit it. I for one am completely incapable of doing so. Reduce what we may suppose to take place to the simplest schematic form. A stimulus excites a nerve-center and the excited nerve-center distributes a response. I am utterly

unable to see how any conscious concomitant of the physiological action of that nerve-center, *per se*, can in any way influence the response. Something must be added which in some way influences the discharge; and this is what we term experience, embodied in other nerve-centers, or in parts differentiated from the automatic centers.

It seems to me, therefore, that we are inevitably forced to assume that the physiological foundation of conscious guidance is, in organisms possessed of a nervous system, a differentiation of control-centers from the centers concerned in automatic response; and that the ascent of mind is the concomitant of the evolution of a differentiated control-system which, during individual life, is constantly playing down upon the system which is concerned in merely organic reflex acts biologically coördinated as instinctive procedure. It is between these two systems, thus differentiated, that interaction takes place.

According to this conception the control-system plays the part of environment to the automatic system which is the physiological mechanism for purely organic adjustment; and this harmonizes with the popular conception of mind as a selective environment. And the characteristic of this environment is that it includes, as modes of experience, on the one hand the surrounding life-circumstances, and on the other hand the responsive organic activities, and brings them into those relationships which we term psychological values. It is this controlling environment which is constantly influencing the course of procedure due to the hereditary modes of response of the automatic centers.

I am well aware that this conception of an environment within the organism itself runs counter to established usage of the term. It will be said that the word implies those external conditions to which the organism as a whole is adapted through heredity or accommodated through acquired modifications of structure or function. It will be urged that it is this external environment with which the control-system is in relation, and that the suggestion I put forward involves an unwarrantable departure from all the recognized canons of biological interpretation. And yet, having all this in view, I venture to put for-

ward the conception in the interests of psychological interpretation. There is not time now adequately to discuss it, even were this the appropriate occasion; only the salient features can be indicated and that very briefly. The determining conditions of psychologically-guided or intelligent behavior, as distinguished from responses which are purely automatic, are what we sum up under the term experience. It is commonly said that this experience is that which stands for, or represents, or symbolizes the environment. I wish to suggest that it *is* the psychological environment under the influence of which automatic responses and instinctive modes of precedure are modified, and that in all cases it includes more than the actual presentations of the environment as that term is used by the biologist. It includes the meaning which that environment has acquired. A chick that has had some acquaintance with the nature of wasps inhibits the instinctive tendency to pick at one when it is presented to sight. That and that alone is the presentation of the external environment at the moment when inhibition is brought into play. That and that alone is not the determining factor in the intelligent avoidance of the insect. This controlling factor is the meaning within experience which the presentation suggests. It may be said that what is suggested is a potentiality of the external environment. But the controlling influence of potentialities is hardly a satisfactory conception. What is actually present then and there is the experience, modifying the output of automatic response. This is to be regarded, according to the suggestion I put forward, as the psychological environment. But it is physiologically embodied in the control system which is the actually present material environment under which the further functioning of the automatic centers is conditioned in intelligent behavior. The essential points then are these: (1) Experience, insofar as it controls behavior, may be regarded as the environment which supplies the conditions of guidance; (2) what the biologist terms the environment is a product of experience; (3) for the physiologist experience must be translated into its neural concomitants in the control system; (4) hence, if, psychologically, experience may be regarded as a conditioning environment, then, physiologically, the control system, as its organic embodiment, may be so regarded.

Now there are diversities of opinion as to the range which should be included under a definition of instinct as contrasted with intelligence, and there are diversities of opinion as to the relations of the one to the other in genetic process, especially as to how far the modifications of behavior produced through the exercise of environing intelligence are directly inherited as variations of instinctive endowment. I do not propose to discuss the *pros* and *cons* of that difficult subject the inheritance of acquired characters. It suffices to say that in accordance with an hypothesis in the development of which I am proud to be associated with Prof. Mark Baldwin and Prof. Henry F. Osborn, intelligent modification of behavior, if it be not the mother of congenital variations of hereditary instinct, may none the less be regarded as their fostering nurse.

This is not the occasion, however, on which to discuss diversities of opinion or indeed to enter, in any detail, into the more distinctively biological aspect of the study of instinct. From our point of view the essential feature of instinctive procedure lies in the fact that the behavior thus characterized is on its initial occurrence prior to and independent of individual experience. It wholly depends, as such, upon how the automatic centers have been built through heredity. And from the standpoint of genetic psychology it appears to me that the really important contribution which the study of instinct offers for our consideration is this: that in any given case of hereditary behavior what we may term an instinctive situation is presented to consciousness, as, ontogenetically, a primary unit-complex of experience, and that, as such, it is developed independently of any guidance in terms of experience. By the situation as presented to the environing consciousness I understand the whole of the initial stimulation, including both external and internal factors, the net results of the behavior as the situation develops, and the satisfaction or dissatisfaction which is attached thereto. We, as psychologists, analyze the instinctive situation. But I conceive that it is presented to consciousness as one developing whole. And the mode of its development is an organic legacy; it is essentially a flow of physiological process in the automatic centers; but it entails a flow of consciousness in the environing

control centers; and this flow of consciousness in its entirety, within a given situation, I am disposed to regard as a primary datum in ontogenetic development.

This thesis, which I purposely express in a somewhat extreme form for the sake of emphasis, involves a protest, I do not say against a too analytic treatment of the early phases of mental process (for it is our function to analyze and compare) — but against the assumption that the products of our analysis are, psychologically considered, genetic units. We sometimes fail to realize to how great an extent we are apt to become the slaves of the disintegrating tendencies of scientific procedure. Because we can break up a situation into what we call its constituent elements, we think that they are separately felt elements in the primary experience. I do not think that this is the case. I regard it as much more probable that the developing situation is collectively felt as it is unfolded; and that complex wholes, biologically integrated, rather than constituent elements, analytically disintegrated, are for ontogenetic treatment the primary data.

On this view, then, instinctive procedure presents to the environing consciousness, embodied in the control system, ready-made situations. And, on the subsequent occurrence of like situations, under substantially similar circumstances, these are dealt with in accordance with the meaning which their predecessors had acquired.

One can not however too strongly emphasize the fact that, in passing from biological responses and reactions, to conscious behavior founded on experience, we introduce a wholly new order of values — values not in terms of organic survival but in terms of feeling-tone. The two sets of values are so often and, of necessity, so predominantly consonant — their inter-relations, are so many and so close, that we are apt to forget that they are radically distinct. Physiology, as such, knows nothing whatever of that order of pleasure-pain values, which for us, as psychologists, are essential. They form no part of the ideal construction of physiology: they are dominant factors in the ideal construction of psychology.

And it is here, just where the strictly biological and the dis-

tinctly psychological factors begin to interact, that the difficulties of analysis make themselves felt. I have distinguished between the automatic system, the functioning of which is determined entirely by biological values in terms of survival; and the control system, the functioning of which in its psychological aspect is determined entirely by a different order of values in terms of feeling-tone. The outcome of the one is instinctive behavior; the outcome of the other is intelligent behavior. But both are dependent on heredity. And it is therefore, I think, essential to distinguish, in our ideal construction, between two orders of heredity: first, that which obtains within the automatic system and which thus determines the nature of the hereditary responses; secondly, that which obtains within the control system and which thus determines the nature of the hereditary likes and dislikes. For analysis these are independent each within its appropriate sphere; but they are developed within the same organism in close synthetic relationship.

At the outset of ontogenetic development instinctive and automatic responses are due to the purely biological order of heredity; but their results are reflected in the conscious environment and therein are subject to the psychological order of heredity so that the controlling influence of the environment is determined by feeling-tone and values for conscious experience. If then we speak of the development of a situation in conformity with the satisfaction it affords, as in accordance with the psychological end, and its development in conformity with the preservation and conservation of the race as in accordance with the biological end, the salient fact is that the two ends are consonant. This has, of course, been fully recognized by evolutionists from Herbert Spencer onwards. I will not here lay stress upon the noteworthy fact, which has not, I think, been sufficiently recognized by the Lamarckian school of evolutionists, that this consonance of biological and psychological end, is admitted to be the outcome of the survival of those in which the consonance obtained, and the elimination of those in which it was absent—that is to say is admitted to be dependent on natural selection. I would rather lay stress upon the fact that this consonance affords a striking link of continuity between the more distinc-

tively biological and the more distinctively psychological factors of the genetic process.

The relation between the two has been well brought out in Professor Groos' discussion of the so-called play of animals. Indeed such play admirably illustrates the two-fold influence of heredity; for on the one hand it is founded on unquestionably instinctive modes of behavior; and on the other hand it not less obviously appeals to an innate sense of satisfaction. Why do animals begin to play and keep on playing? From the psychological point of view because they like it: from the biological point of view because they thus gain practice and preparation for the serious business of their after life. But why do they like it? Because under natural selection, those who did not like it, and therefore did not undergo the preparatory training and discipline of play, proved unfit for life's sterner struggle, and have been therefore eliminated. I have contended that inherited modes of behavior present to consciousness ready-made situations which develop automatically on biological lines, and that the rôle of environing intelligence is to lead to modifications in their redevelopment in accordance with their psychological values. I have also called to remembrance the fact that in the animal world, under normal conditions, these psychological values with their appeal to feeling are consonant with biological values in terms of survival. Throughout the course of mental development, in the perceptual sphere, there is a constant interaction between the two factors broadly classed under the heads, 'instinct' and 'intelligence.' And it is the province of detailed study to assess at their true value the rôles played by these two factors in the particular cases which fall under consideration. A biological survey of the field discloses the fact that when the conditions of life are constant and uniform the instinctive factor, subject to organic selection, predominates and complex groups and trains of reflexes assume a stereotyped form. This is due to what we may term a biological coalescence of unit situations into a coördinated whole. What we call the instinctive behavior of many of the insects for example seems to be the inherited grouping in biological sequence of inherited units of response. But in relation to more varied circumstances the

intelligent factor predominates. The hereditary unit-situations may not be fewer, may indeed be more numerous. But the manner of their coalescence and coördination is rather psychological than biological. The higher animals exhibit an intelligent plasticity which enables them to meet the requirements of the more complex surroundings into which their life has risen, and which is reflected or symbolized by the psychological environment. Here a stereotyped coördination of the hereditary units of behavior would be rather a hindrance than an advantage. The winning animal in life's struggle would be the one in which behavior was most rapidly and most surely modified to meet particular needs — the one in which the teachings of experience were most promptly used in effective action. The inevitable tendency of the evolution of intelligence must be the disintegration of stereotyped modes of behavior as biologically coördinated wholes and the dissolution of instinctive complexes into relatively independent instinct units which would be thus free to coalesce into new groups under the guidance of experience. Thus it is that in the more highly developed animals, and in the human subject, the instinctive units assume rather the form of a number of congenital tendencies or propensities than of instinctively coördinated wholes of behavior, the former being less stereotyped than the latter. And thus it is that in them there is a shorter or longer period of inefficiency during which the inherited unit-situations are coördinated psychologically in new groups under the influence of individual experience as a shaping environment.

Throughout the whole range of perceptual development under these conditions there is progressive integration and differentiation of the unit situations, always on essentially practical lines, always in closest touch with active behavior. Even perception itself, as genetic psychology has helped us more fully to realize, is dependent on acquired habits of action. Perceptual meaning and value are ever dependent on some activity directed toward that which is so perceived. All differentiations within the presented situations are due to the call for some directed behavior, are due to the demand for some focussing of active manipulation. Thus is the mouse differentiated for the

practical interests of the kitten. And all integration of diverse situations is due to their assimilation in terms of like modes of behavior in dealing with them, in terms of the similar responses which they evoke. Thus there is an integration of the situations of so-called play and earnest. But in perceptual process, far as differentiation may be carried, it never reaches the stage of intentional analysis; and, far as integration through assimilation may be carried, it never reaches the level of intentional generalization. These are the results of ideational process.

It will be noticed that I here lay marked stress on the distinction between perceptual and ideational process. I said at the outset that comparative and genetic psychology takes its place between biology on the one hand, with its doctrine of values for organic survival, and, on the other hand, such normative sciences as ethics and æsthetics with their doctrines of worth for the ideal life of man. It appears to me that in the relation of biology to psychology the essential point is to grasp the analytic distinction between the instinctive and intelligent factors, and I have therefore so far mainly dealt with this distinction. But it also appears to me that in the relations of psychology to normative science, the equally essential point is to grasp the distinction between perceptual and ideational process. In the study of the higher ranges of animal psychology and of child life this distinction has scarcely yet received adequate emphasis.

The study of the mental processes of the higher animals has of late years passed into a new phase. In the first place it is now realized that, so far from being easy it is full of peculiar difficulties and beset with special snares which entrap the unwary interpreter. In the second place it is generally admitted that adequate training is required to enable an observer, no matter how accurate and faithful his record of facts may be, to diagnose inferentially the psychological conditions of which the facts themselves are significant. And in the third place it is recognized that far more is to be gained by the systematic study of the doings of animals under controlled conditions and in test cases, than by the casual observations of credible but often uncritical witnesses. The new phase of the study of animal intel-

ligence is thus characterized by experimental research in the hands of those who are trained psychologists, and who are fully aware of the difficulty and delicacy of the task which they undertake.

We must remember that in the early days of Darwinism, the first business of those who sought to place the conception of mental evolution on a secure basis was to establish the basal principle of continuity in the series of mental products; to show that in animals are to be found the germs of all the higher endowments of man; and to abolish all such radical distinctions in kind as were then held to form an impassable gulf between the brute beasts and man with his spiritual capacities. This tendency, which was inevitable as a stage in the progress of thought, led to the utmost widening of the limits within which psychological terms, such as 'inference,' 'abstraction,' 'generalization' and 'reasoning' were used; the extension being designed so as to render these terms as comprehensive as possible and to enable them to cover not only fully differentiated processes but the earlier — even the embryonic — stages of their development. But when the conception of evolution had won its way to acceptance, when the principle of continuity had taken its place as part of the recognized scheme of scientific interpretation, the emphasis of thought changed from the evolutional curve as a whole, now freely and fully accepted as continuous, to the differentiated stages which could analytically be distinguished therein. They were applied again in more restricted senses; the restriction being designed to render them distinctively applicable to certain higher phases of differentiation within an admittedly continuous process.

In any case it is necessary to bear in mind the fact (of which I have suggested the probable cause) that the same terms are applied by different authors with wide differences of limitation — by some in a more extended and by others in a more restricted sense. From this it follows that some at least of the divergences of interpretation in the comparative psychology of animals are more apparent than real.

The influence of the terms we employ, closely connected as it is with our early training, is often deep and abiding. It has

been a special merit of Dr. Stout's treatment of psychological topics that he has emphasized, so clearly and in so many ways, the fundamental distinction, as I conceive it to be, between perceptual and ideational process. As he himself has pointed out, one of the great difficulties in the way of its general acceptance, is due to the fact that the existing terminology grew up at a time previous to any serious attempt to render clear the distinction. Some of my hearers may remember the almost pathetic words in which Dr. Stout laments the misleading influence of the terms we are at present almost forced to employ. If I may be allowed slightly to modify his statement without, as I believe, introducing anything foreign to his thought, his contention is that "human language is especially constructed to describe the mental processes of human beings [in ideational terms] and this means that it is especially constructed so as to mislead us when we attempt to describe the workings of minds which differ in any great degree from the human" and even the workings of our own minds on the perceptual plane. "A horse having had a feed at a certain place one day, stops of his own accord at that place on a second journey. People say that it remembers being fed here before, and infers that it will be fed here again. In all probability these words with their human implications [on the ideational plane] are quite misleading. Suppose that the master of the horse is a bibulous person, who takes a drink as a matter of course whenever he comes to a public house on the road. In order to do this he need not go through the process of remembering that he has had a drink at a public-house before, or of inferring that he can have a drink at a public-house again. He simply has a bias to stop at a public-house whenever he comes to one. Probably the horse's act implies just as little of remembering or inferring."

It will be noticed that the difficulty which Dr. Stout indicates, does not apply only to the mental processes of the horse, but also to some at least of those which are characteristic of his bibulous master. No doubt, taking men and women as we find them, there is the closest interaction between ideational and perceptual process, just as there is between instinctive and intelligent procedure. But there is, I conceive, an analogous

relation. Just as the instinctive factor provides data which intelligence deals with so as to shape it to more adaptive ends, so does the perceptual factor provide the more complex data which, through ideational process, are raised to a yet higher level in rational conduct. And in both cases notwithstanding, nay largely in consequence of, the closeness of the interaction it is the business of analysis to distinguish with the utmost clearness the essential features of the constituent factors.

I take it that the leading characteristic of perceptual process is the dealing with situations as wholes in their unanalyzed entirety. When the integration of which I have spoken has been carried far, any relatively new situation is assimilated to the past experience gained in similar situations wherein certain salient features have been differentiated through their intimate relation to practical activities. The associations thus begotten are not associations between separate ideas but in every case essentially between the situation and the practical behavior it calls forth. Even this expression savors too much of analysis. Let us rather say that the type of association distinctive of perceptual process is that between an early phase of a situation and the succeeding phase, so that what is suggested in any given case is a mode of development of the situation as a whole through practical behavior. That is the essential feature of the doctrine of meaning in perceptual process. It is meaning in terms of a specific development of the situation as a whole; it is meaning closely bound up with a felt impulse to act in a certain way; it is the meaning which attaches to the public-house as the result of practical experience on the part of the horse and of his bibulous master.

Now, it appears to me that recent researches all point to the fact that the mental processes of animals are mainly — I do not say entirely, though I myself still incline to that opinion — but at all events mainly, on the perceptual plane. They tend to show that animals, even the monkeys, deal with situations as complex unity-wholes. The method of learning is chiefly dependent on practical behavior which, carried out with varied and persistent — often restless — activity, leads the animal unsystematically to stumble on new associations between such behavior

and the situation within which it arises. But it also appears to me that a very large proportion of human process is predominantly upon the perceptual plane. I say 'predominantly' because even this section of human activity is inevitably influenced by the ideational section which is superinduced thereon. And there is, I repeat, no little difficulty in determining its range, as perceptual, just because our psychological language almost necessarily leads us to describe it in ideational terms — the terms begotten of comparison, analysis, and synthesis.

It is through such steps, and such steps alone, that on the basis of perceptual experience, systems of knowledge can be built. This is the product of ideational process. It involves an ideal or schematic construction. And when situations are viewed from the standpoint of a system of knowledge their salient features have not only meaning for practical behavior, but also significance in relation to that system. They are apperceived as particular examples which illustrate some general scheme or principle. They are subject to the influence of a new environment. And it is here that psychology comes into touch with normative science. No doubt, normative science, as its name implies, deals with standards of reference — in ethics, for example, with standards of 'ought.' But this is only an implication of the fact that the particular act is viewed in its relation to an ethical scheme of conduct. Impulses arise within the situations as they occur and as they are dealt with in and for themselves. But motives, as the term is used in ethics, imply the relations between these several situations and a system of ideals. Only on the ideational plane do there emerge considerations looming up beyond the situations into a prudential, moral or other scheme; behavior is thus raised to the level of conduct; and a situation is developed, not only in accordance with the impulse-value arising therein, but in accordance also, and in greater degree, with the motive-worth for a system.

One of the characteristics of ideational, as contrasted with perceptual reference is that, whereas in the latter the salient feature of the situation is always the center of development, in the former the comparison is with independent centers, or an independent scheme, to which many situations may be referred. This

may be illustrated by the different attitude of the two types of process to relationships in the surrounding world. For perceptual process these relationships are not disentangled in analysis from the complex within which they are embedded, nor are they synthetically rebuilt into new unity-wholes; but they are none the less contributory, within the complex, to practical behavior. Suppose one is shown into a strange room and deals with the situation in purely perceptual fashion. One assimulates the various impressions in terms of past experience. At any given moment some object — say the clock on the mantel shelf — is in the focus of vision. The others are grouped around it in the margin of the visual field — the picture above, the fire-place below, the bookcase on one side, the cabinet on the other. These are the spatial relationships within the field for perceptual experience. But in and for the situation as such the center of reference is always the focus of the field. It is a constantly shifting center. As the eyes flit from object to object the focal impression changes again and again. And with each change the space-relations of other objects, more dimly seen in the margin of vision, are rearranged. But always for the situation itself, as contrasted with systematic knowledge, the center of reference is the focus of vision (or other mode of perceptual experience) at the time being. It is an essentially practical center. It *means* that so much movement of the eyes or hands or body as a whole in this or that direction will bring this or that impression, at present marginal, into the focus. Practically perceptual folk constantly tend to deal with a spatial situation in this way. They picture how they would act in the midst of it. Ask a farmer's lad whereabouts the church is in his native village. He will probably reply that as you leave the Blue Boar public house (his focal point) you must first turn this way, then that way, and then go straight down the street till you get there. The distinguishing feature is that the spatial relationships which are disentangled in ideational process for purposes of schematic construction and rebuilt in a conceptual scheme of three dimensions — a scheme independent of, but applicable to, particular situations — are for experience on the perceptual plane parts of a given complex, having meaning for practical behavior, but as

yet no significance for systematic thought. They are not subject to the influence of an environment of ideational constructions.

For we are now in a position to extend the conception of conscious environment. Intelligence, in the perceptual sphere, embodying the coalescent representation of concrete situations plays the part, as I suggested, of environment to the automatic responses. And this undergoes evolution to higher and higher levels in perceptual process. But in ideational process there is superimposed a further environment under the influence of which intelligent procedure is itself controlled. This higher environment is constituted by systems of knowledge, ideals of conduct, and artistic conceptions. Just as intelligence fulfilling its function of environment, plays down upon organic procedure, shaping it to more perfect adjustment to the circumstances of perceptual life, so does reason, as environment, play down upon intelligent procedure, moulding it to more perfect adjustment to the conditions of ideational life.

According to this conception, there are superimposed upon the pleasure-pain values in terms of feeling-tone, yet higher motive values of a new order in terms of logical, ethical, or æsthetic worth. And if we attempt to translate this into physiological terms, not only is there a differentiation of a control system from the automatic nerve centers, there should also be a further differentiation within the control system itself, yet higher intellectual centers being differentiated from those which are concerned in perceptual process.

There is however a further distinction which is important for the comprehension of the social influence of ideational process. Perceptual intelligence is, in the main, receptive and representative of a natural environment which takes form independently of the exercise of its influence. Only in a limited degree are its products in behavior so applied as to modify and enrich that natural environment. The beaver indeed constructs its dams, the bird builds its nest, the spider spins its web, and so forth. Some amount of choice of environment through subjective selection is possible. Some products of behavior are projected on to the plane of its organic or inorganic surroundings. But it is a characteristic feature of ideational process that it is constantly,

in an indefinitely larger degree, embodying the products of its rational environment, as developed in consciousness, in concrete form so as to constitute part of the physical and intellectual surroundings. Subjective selection is a most potent factor in human life. To an extent only foreshadowed in the animal world does man both create and select his own environment of circumstance. And this is the keynote of the higher human evolution as contrasted with that which obtains among the lower animals. It involves a transference of evolution from the organism to the social environment.

Now if the distinction between perceptual and ideational process is sound in principle, it is of fundamental importance in dealing with the higher ranges of psychological development. In any case, whether the subject be man or child, dog or monkey, it is our duty to devise such methods of observation as shall enable us to apply these principles in such a way as to analyze out the two factors, supposing that both coexist. As I read the results of the recent researches of Dr. Kinnaman, Professor Thorndike, Mr. Hobhouse and others, on the intelligence of the primates, there seems however, but little evidence, even in them, of the schematic products of ideational construction. And the question arises whether such products are possible without language as an instrument of analysis and synthesis.

In attempting to deal, I fear very inadequately, with the subject committed to my charge, I have essayed to give a very broad and general survey of the genetic sequence. Starting with biological reactions and bringing these into touch with the early stages of intelligent guidance, the essential feature is the occurrence of a new order of values, those of feeling-tone in terms of pleasure-pain. So long as situations are dealt with naïvely in and for themselves these values are the determining psychological factors, but always in close and vital relationships with the survival values of the biological mode of explanation. At some stage, however, of the evolutionary process a new order of values has its rise and origin — these are connected with ideal schemes and systems; and they are in terms of worth for the ideal life. Just as intelligence forms the environment under which automatic responses are guided to higher ends, so does

some sort of rational system form the environment under which perceptual processes are controlled. Here we have the scientific foundations of ethics. But here too, important as these scientific foundations may be, many of us feel that they are insufficient; and we are thus brought into close relations with those metaphysical postulates which are outside the sphere of comparative and genetic psychology, quâ science — with relations which no doubt have been or will be discussed in another section of this comprehensive Congress of Arts and Science.

MENTAL PATHOLOGY.[1]

BY PROFESSOR PIERRE JANET,

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GENTLEMEN: I feel that it is a great honor to be called upon to address the Section of Pathological Psychology in the St. Louis Congress. The United States has done much for psychology. Your magnificent laboratories, your important publications, and your eminent men who have devoted themselves in great numbers to psychological investigation, have contributed abundantly to the development of the science. We are pleased to come and admire your work; we are proud to bring to you the results of our own investigations.

I am the more encouraged to present to you the greetings of the psychologists of France, by the fact that we have been concerned chiefly with the somewhat specialized topic of pathological or abnormal psychology to which this section of the Congress is to be devoted. If I mistake not, the investigators of other countries tend to separate two branches of study which we are disposed to unite; they study on the one hand, the psychology of the normal individual, or the individual who is regarded as being normal, and on the other hand, they are concerned with mental diseases, their analysis and especially their classification. It seems to me that we in France, under the influence of two of my masters, Ribot and Charcot, whose names I am pleased to recall to you, have endeavored rather to throw light upon psychiatry by a study of normal psychology; and to regard mental diseases as experiments which have been cunningly devised by nature to show us such suppressions and modifications of function as the experimental method demands. Our psychological laboratories, situated as they often are in hospitals for nervous and mental diseases, as at the Salpétrèire, at Ste. Anne and at

[1] Address delivered at the Congress of Arts and Science, St. Louis. Translated by J. W. Baird, Johns Hopkins University.

Villejuif, have endeavored to unite the psychologist and the alienist in a common investigation.

This union, alike in France and in other countries where it has also been accomplished, seems to me to have been advantageous to both sciences. In psychiatry it has to some extent turned the investigator aside from investigations which are actually useless because they cannot be utilized. One is scarcely able, even to-day, to make a complete classification of mental disorders from a single point of view as is required by logic. As Ziehen has remarked, mental diseases are classified differently from the standpoint of symptoms, of etiology, of evolution and of pathological anatomy. Moreover, it must be confessed that we do not know the real causes of mental diseases; and it is bootless to disguise our ignorance by a cloak of philosophical speculation or of hypothetical anatomy. The pathological psychologist has recognized that he must begin at the beginning. He has endeavored to penetrate more thoroughly and more sympathetically into the mental states of the diseased; he has attained greater accuracy in the analysis of symptoms; he has observed and, so far as possible, has measured the alterations of psychical function. In short, psychological experimentation has introduced into psychiatry a rehabilitation and a refinement of the clinical method.

The older psychology, permeated as it was throughout with philosophical speculation, claimed to find that the mental states were as simple and as unchanging as its theories. It studied memory in general, reason in general, the theoretical and abstract will, without first taking up the question as to what constitutes memory, reason and will in a particular individual, under particular conditions, at a particular age, in a particular state of health. The investigation of pathological conditions has forced it to recognize that these phenomena are not fixed and immutable; it has come to see that they wax and wane, that they are subject to change, and that a multitude of degrees are represented in their developmental transformations. Psychology has thus been led to seek, even in the normal individual, for those changes and oscillations which it has found to be characteristic of the abnormal individual; it is no longer abstract, but has

become a more real and living thing. If one may use the expression, it has ceased to be purely static, and has become dynamic. The study of the oscillations of mind which have been brought to light by pathological psychology, has called attention to a group of phenomena which can scarcely be classified among the older faculties, and have been neglected as being of no significance — the phenomena of fatigue, of sleep, of the emotions, of the various forms of intoxication, of the neuropathic disorders. It has also called attention to the opposite modifications which occur in repose, in the waking state, in calmness and *sang froid*, and in convalescence (even though it be but temporary). These modifications constitute the most apparent oscillations of mind. Permit me to lay emphasis upon these depressions and these excitations, and to remind you of the investigations which have been made in this connection. The topics which have not yet been investigated are of even greater significance; they represent the most important of the present problems of pathological psychology.

One of the first modifications of mental states to which I wish to call attention, is illustrated by the semi-normal, semi-pathological condition which is induced by fatigue. It is a familiar fact that the physical and mental being does not always maintain a constant condition; that it is incapable of manifesting uniform phenomena when submitted to prolonged effort; that its functions vary from the beginning to the end of a period of work. And the change induced is essentially of the same character whether the work be physical or mental. The investigation of fatigue dates from an early period. You doubtless recall an old observation by Holland which has been cited by Ribot.[1] "An engineer relates the following experience: 'When I was down in a mine, I felt myself overcome with fatigue and lassitude to such a degree that I found it impossible to converse with the German inspector who accompanied me. Every word, every phrase of the German language had escaped my memory, and I recovered them only after taking nourishment and rest.'" Here we have a first well-marked opposition between the normal state and the state of fatigue. Oppositions of this sort have been the

[1] Ribot, *Maladies de la mémoire*, p. 114.

object of numerous investigations, among which may be mentioned Galton's interesting study of the influence of fatigue and overwork in schools, the investigations of a great many German authors, instigated for the most part by Kraepelin, the remarkable observations of the French physician Tissié, who made a physiological and psychological examination of the contestants in various forms of athletic sports, the investigations of Féré, of Binet and Henri, etc. All of these investigations show the presence of modifications of constant character.

It is to be noted first of all, that an apparent exaggeration of function occurs with the advent of fatigue. This functional change makes its appearance in the form of a physical agitation, or in other words, an exaggeration of movement. Galton found signs of fatigue when he examined the posture of a subject to whom a difficult passage was being read aloud. The fatigued auditor yawns, stretches himself, shifts his position and contracts certain facial muscles. In school-children one may observe movements of the eye-brows, of the lips, of the forehead, and of the fingers; and if the degree of fatigue be increased, these movements soon pass over into chorea and tic. Experimental investigations, such as those of Sommer and Bettmann, have revealed the presence of a modification of the reflexes and an increase in the number of tremors in the ergographic curve. Pathological investigations have shown an exaggeration of the reflexes, an extension of innervation to the unused muscles, an involuntary laugh, a muscular tremor, and spasms of various sorts, etc. The agitation induced by fatigue may also be visceral; I cannot lay too much stress upon the spasms of the digestive organs, the changes of respiratory rhythm, the profuse perspirations. The agitation may even be mental. Galton observed irritability, ill-humor, a tendency to magnify small things; and more recently, attention has been called to various forms of fancies which take possession of the mind and may even degenerate into pathological obsessions. The subject is well aware that something abnormal is taking place within him; he is conscious of certain abnormal sensations. Galton emphasized the feeling of incapacity which increases with increase of fatigue; Oehrn, in 1895, and more particularly Tissié laid stress upon

the feeling of weariness as a characteristic symptom of fatigue. These phenomena are observed alike in bicyclists, in children who do mental work and in subjects who repeatedly perform an experiment. These feelings correspond to something which is perfectly real; it is possible to demonstrate in various ways that a decrease of mental function runs parallel with the agitation. Whether we examine the subject's penmanship, or measure his capacity to insert a needle into holes in a perforated plate — as I did in 1889, and as Bryan has done since — we invariably find a lack of dexterity, a lesser precision of movement. The diminished rapidity which is found to be characteristic of reactions and of all sorts of motor adjustments has been demonstrated in innumerable ways (Kraepelin, Oehrn, Burgerstein, Vaschide, Binet and Henri). On the other hand, attention and power of apprehension also decrease in considerable degree; and one finds an increase in the number of errors in tasks whose accomplishment depends upon automatic mental processes, or the mechanical association of ideas (Cattell, Finzi, Sikorsky, Hopfner, Burgerstein, Laser, Thorndike, Binet). The memory undergoes a change, as we saw from the illustration cited by Ribot; acquisition becomes more difficult (Ebbinghaus, Finzi, Schneider); the power of recollection, the certainty and the correctness of response decrease (Ranschburg), and certain classes of memories disappear entirely.

The disturbance even extends to perception (Grote, Marine, Griesbach, Leuba). All of these phenomena are in striking contrast with those that occur in repose. This opposition between the mind in the state of rest and in the state of fatigue, is of prime importance for pathological psychology.

Similar phenomena are to be observed in the various forms of intoxication; here too is to be seen an interesting opposition between the mental state of the intoxicated and of the non-intoxicated individual. Numerous investigations, such as those upon haschish by Tours, those upon alcohol by Richet, and many others, have established phenomena which are analogous to the phenomena of fatigue. But I wish to direct your attention to a class of investigations which has reached a high degree of development in France — those of sleep, or rather of sleeps,

for there are many states to which this general name may be applied.

Sleep is a type of oscillation which is particularly deserving of notice in this connection, because it is a wholly relative condition; its phenomena can be determined only in relation to the waking state. An essential characteristic of sleep is the fact that it is attended by a lesser activity of the vital functions. It is not enough to say that sleep is a state in which the temperature of the body averages 36°, the pulmonary expiration is two liters, and the pulse is 54. One must add that these phenomena occur in an organism which is capable when in another condition, of having a temperature of 37°, a respiration of nine liters, and a pulse of 70. It may be said that the organism is unable to keep up its more active form of existence continuously, and that it practices economy during a part of its life. Nor is the oscillation solely physiological; it is mental as well. Dreams are the thoughts of the sleeping man. I need not remind you of all the investigations of dreams which have been made from the time of Hervey de Saint Denis and of Charma, down to the recent publication of Sante de Sanctis. Let me mention however that dreams are attended by a mental agitation which manifests itself in hallucinations, and in a ready association of images which arrange themselves into tableaux with interminable kaleidoscopic changes. Sense-impressions of slight intensity give rise to complex dreams of similar modality (Maury, Sergueyeff, Mourly-Vold). These dreams are characterized by exaggeration and repetition; the Cartesian flea-bite becomes a sword-thrust, and a trifling weight seems an Etna upon the chest. The same dream recurs countless times with wearying monotony. The memory of experiences long since past is vivified; the instincts and the habitual tendencies have free play and develop immoderately; even the hereditary tendencies may intervene in intense degree. It is true that the dreamer may feel that it is all unreal and fictitious, but he is carried along by the turbulence of his imagery, and he frequently experiences the most violent emotions from his images. Side by side with this exaggeration of certain mental functions there occurs a diminution of other mental functions; and some of the latter are most peculiar and extremely characteristic.

It is evident that the consciousness of personality is disordered, and that a duality of personality tends to rise. Charma and Delboeuf report dreams in which a school-master asks them a question; they are unable to answer but a school-mate rises at their side and to their astonishment gives the correct answer. In another case the dreamer says to a child: "Be careful that you do not tumble," and he himself slips. Thereupon the child replies: "Why don't you follow the advice which you give so freely to others." Again, a dreamer who has a pain in his head, meets a child who is also suffering from headache, and asks the child to suggest a remedy. Will and attention are wholly lacking in dreams. There is no real adaptation either to internal, to external or to future conditions. There is no resistance, no control, no criticism.

I should like to mention a particular form which the diminution of attention assumes in dreams. Several authors (Egger in France, Schneider in Germany) have pointed out that in dreams only the center of the mental picture is illuminated; the outlying parts are invisible, or rather they are non-existent. The pictures appear without any setting. And it is just this absence of surrounding objects, *i. e.*, of environment of thought, which explains the absence of comparison and criticism that is characteristic of dreams.

The study of one's memory of dreams reveals other interesting characteristics of the enfeeblement of attention. In the first place, dream experiences do not become firmly fixed upon the memory. When we awake we fail to remember what we have dreamed, and dreams which do not recur are forgotten as soon as they take place. This is the form of oblivescence which in another connection, I have called continuous amnesia, and it is interesting to note that it is to be found in dreams. But there is an even more peculiar feature; Delage, de Sanctis, and Pilcz have observed that the striking events and the intensive emotions of the day do not reappear in the dreams of the following night. The mother who has just lost a child is surprised to find that she does not dream of her loss although that subject has occupied her mind all day long. These authors furnish different explanations of this fact, which need not be

discussed here. Let us remark however that the oblivescence of recent experiences is well known under the name of retrogressive amnesia. In this disturbance, as in dreams, events reappear in memory only after they have long since been experienced. By way of summary, we may say that dreams are characterized by a narrowing of the field of consciousness, by continuous and by retrogressive amnesia.

Other phenomena which are equally semi-normal and semi-pathological, appear in the emotions. When an individual finds himself suddenly placed in a position to which he is not already adapted by previous habituation, when he lacks the time or the strength required to adapt himself to the new conditions, he experiences certain forms of physical and mental perturbation which are of prime importance. In this country where the James theory of the emotions was developed I need not discuss the emotional value of the visceral excitations. The increase of heart-beat and of respiration, and the spasms of the digestive organs, are well-known features of the state of emotion. It is also known that hunger assumes an exaggerated form in emotion, a phenomenon which in all probability gave rise to the custom of feasting at funerals. These internal excitations extend to the muscles of the members, and in many emotions one may observe an indefinite repetition of violent and useless movements, grimaces and convulsive contortions of all sorts. Numerous authors have been pleased to find in these incoördinated movements, a trace of more or less complete acts which are inhibited in their initial stages in the modern subject; that is, to regard them as vestigial products of movements which attained complete execution when our human or animal ancestors were exposed to similar conditions of stimulation. Stanley Hall's and Dewey's investigations of anger give us a great deal of information upon this point. Moreover it frequently happens that the tics, the various forms of tetanus and the impulses to flee or to cry out, remain undeveloped in the presence of emotional states.

But we must not confine ourselves to the peripheral manifestations of emotion. The weak point of the famous theory is to be found in the dictum that: 'We are sorry because we

cry'—an objection which has been urged by many authors (Irons, Gardiner, Soury, Dearborn, Sherrington, Baldwin and others). Side by side with these motor phenomena, which have quite correctly been called extra-motions, there occur intra-motions which constitute retroactive modifications of consciousness; and these psychical resultants are no less important than their physiological concomitants. Emotion is attended by a mental agitation, just as it is attended by a physical agitation. A multitude of ideas surge into consciousness and disturb the equilibrium. Some years ago, attention was called to a phenomenon which has since been referred to as the hypermnesia of the dying. Those who have escaped from imminent danger report that at the moment of impending death they saw before them as in a panorama, the chief events of their lives. This is simply a case of the phenomenon of hyper-ideation which characterizes many of the emotions. Dreams, muttering in somnambulistic states, hallucinations, and even indefinite interrogations are only an exaggerated form of the phenomena observed in the normal individual who talks to himself of an event which has made a violent appeal to his emotions.

Then too the emotions are characterized by feelings which are analogous to those already discussed—feelings of weariness and of powerlessness. The subject's personality undergoes a change; he no longer feels like himself, and even the external world loses its reality in greater or less degree.

Depression is no less a feature of emotion than is agitation. The depression may be visceral; it may manifest itself in a diminution of circulation or of respiration (which in emotion as in sleep, assume the intermittent type of Cheyne Stokes), in impairment of digestion and in gastro-intestinal debility. It may be motor, and evince itself in all the forms of weakness and paralysis which are found to attend certain emotions. A passage from Tolstoi which has been cited by Dumas in his book on '*La tristesse et la joie*,' furnishes an excellent illustration of this feature: "The assassins could easily have escaped from the scene of their crime, but they were so overcome by emotion, so enfeebled in all their limbs that they found themselves incapable of flight. Feeling wearied as though by a long walk, they lay

down upon the road, and there they remained until they were arrested." The mental depressions are particularly interesting. Popular observation noticed long ago that the individual, when overcome by emotion, is 'not himself,' that he is 'beside himself.' And I have shown on numerous occasions that the characteristics which have been acquired by education and moral development may suffer a complete change under the influence of emotion. People who have learned to speak correctly revert to dialect or resume a foreign accent when they are deeply moved. Their writing becomes confused, clumsy, boyish and full of faults; their whole character becomes coarse and debased. These general depressions are analogous to more definite disorders, and here again the disturbances of memory must be mentioned. Oblivescence of the event which occasioned the emotion, and inability to remember facts which immediately preceded, have frequently been found to accompany intensely emotional experiences in the form of continuous and retrogressive amnesia. But it must not be thought that these phenomena are merely pathological caprices. They are an exaggerated form of a general disturbance of memory which is characteristic of all emotions.

In his celebrated book on *Mind and Body*, Hack Tuke remarked that emotions frequently render the subject insensible, and he reported having seen subjects become blind and deaf as the result of violent emotion. I too have described many similar observations and they have now become a common-place. These disorders of sensibility and memory are analogous to certain disturbances of perception and attention; and the analogy holds alike whether the object of apprehension be one's self or whether it be the external world. As to will, there can be no doubt that it disappears in the depressive emotions and that the subject, when under intense emotion, is unable to decide what to do; indeed he even loses the power to act upon previous decisions. Hence one may well ask whether the mental commotion is not a more important characteristic of the emotion than is the visceral change. And one seems justified in regarding the consciousness of an emotional state as being something more than a mere counter-effect of peripheral disturbances.

These intellectual modifications, these losses of memory, these lacks of decision, these doubts, these failures to see reality as it is and to react upon it as one has previously learned to do, together with the feelings of depression which result from the changed mental conditions, constitute, in my opinion, the essential feature of emotion; and the sensations which arise as a 'back-stroke' from the peripheral disturbances is nothing more than a reinforcement, like the added tone in the chord.

It is a remarkable fact that certain emotions are attended by effects which are diametrically opposite to those just described. This second type of emotion may induce calmness, strengthen the visceral functions, arrest the useless mental agitation and replace it by an increased activity of attention and will. This improved condition of attention and will strengthens the tenacity of memory; it gives rise to valid representations of reality and to effective reactions upon one's environment. There are emotions which elevate as well as those which depress, emotions which heal as well as those which destroy. And here again as in fatigue and in repose, in sleep and in the waking state, we find a remarkable illustration of the oscillations of mind.

Let us now leave those phenomena which may be regarded as normal and examine the characteristics of mental diseases. Here we shall find phenomena of exactly the same sort as those which have already been discussed. Pathological psychology owes much to the study of hysteria. That hysteria is characterized by phenomena which are analogous to those which have been established in fatigue, in the sleeps, and in the emotions, is clearly evident from the different theories of hysteria which have been advocated. Certain investigators have insisted that hysteria is a purely emotional disturbance (the old theory of Briquet). Others have held that hysteria is a sleep-disease — a neurotic disturbance which is due to an excess of sleep (Sollier). Others again, find an analogy between hysteria and fatigue, and make the former the effect of an excessive degree of the latter (as Féré did in 1885). As for myself I am an out-and-out eclectic; I believe that hysteria is a disorder of emotion, of sleep and of fatigue, because all of them are at bottom exactly the

same thing. In hysteria one may observe the same intensely exaggerated agitations as are to be found in convulsions, crises, spasms, hallucinations, and in all other cases in which ideas develop automatically as a result of suggestion. One may observe the same feelings of weariness, of powerlessness, and of automatism. "I can see my arms and my legs moving, but it does not seem to be myself. I am a marionette and somebody is pulling the string." One may observe especially the same depressions and the same inefficiency of the higher cerebral functions. Permit me to recall my investigations upon aboulia, aprosexia, and amnesia in hystericals. If an act is even moderately novel, if a situation presents a problem to be solved, the hysterical remains inert and powerless. It is a remarkable fact that the disturbances of mental synthesis which occur in hysteria, bear a close resemblance to the oscillations of mind which have already been described. For example, suggestion which plays so important a rôle in this disease, can only be explained from the absence of antagonistic ideas which might counteract the idea suggested. This fact shows that the idea remains isolated in the mind of the hysterical, that it develops in the midst of a void, that the picture is not inclosed in a frame. And this is exactly what has been found to be characteristic of dreams. The anæsthesias, and frequently the paralyses, of the hysterical, alike consist of a reduction or narrowing of consciousness which is no longer able to make a simultaneous fusion of all the sensations and all the images which come in from without. This is well explained from the remarkable facts which relate to the transference, or better, the equivalence of phenomena in hystericals. One symptom gives place to another, one paralysis is cured and another supervenes, as though the mind were incapable of constituting a single system, and could resume control of one side of the body only at the expense of losing control of the other side. The narrowing of the field of consciousness in hysteria is of the very same sort as we found to occur in sleep and in fatigue.

In hysteria we again find interesting disturbances of memory — continuous and retrogressive amnesia — which are identical with those that occur in dreams and in emotion. It is a familiar

fact that at the end of an emotion we find that we have forgotten the preceding events, and we are incapable of acquiring the memory of new events. But hysteria is nothing more than this; and that is the reason why an endless discussion has arisen as to whether the hysterical is not merely an individual who has been overcome by emotion, and as to whether traumatic neurosis is not simply hysteria. The narrowing of the field of consciousness seems to me to be the characteristic form which the mental depression assumes in hysteria.

Let us now consider another disease which I have studied these many years, and which I have discussed in my most recent volumes. Let us take a glance at the innumerable disorders which have been designated obsessions, impulsions, insanity of doubt and of touch, tics, phobias, etc. No matter how various their symptoms may appear, it is possible to find certain fundamental characteristics which are common to all of these diseases. Motor, visceral or mental agitation manifests itself in unmistakable form in all of these crises of motor agitation, these contortions and tics of all sorts, and in the anguish which constitutes the essence of all the phobias. Everybody knows the peculiar mental agitation of those abnormal individuals who busy themselves incessantly with some insoluble problem, who spend whole days in an endeavor to remember what they did at a certain hour on a certain day ten years ago; who exhaust themselves in attempts to understand why trees are green, or why people have noses; who try to count all the objects they see, or to atone for every act by an appropriate exorcism.

All of these agitations seem to have their source in certain feelings which are extremely varied and interesting. I shall mention only the most familiar forms. In connection with all his acts the subject experiences feelings of difficulty, of inutility, of incapacity, of indecision, of uneasiness, of automatism, of domination, of discontent, of humility, of shame, of intimidation, and of revolt. In connection with his intellectual operations he has feelings of difficulty, of insufficiency, of instability, of imperfect perception, of gloom, of strangeness, of *jamais-vu*, of mal-orientation, of isolation, of mal-recognition, of *déjà-vu*, of presentment, of unreality, of dreaming, of the lapse of time, of

lack of intelligence, of obscurity, of doubt. In connection with his emotions there occur feelings of indifference, of weariness, of anxiety, of ambition, of need of excitement. In connection with his personality one may note feelings of self-estrangement, of double-personality, of depersonalization, of death, etc.

These feelings are far from being fictitious; they are based upon a real depression of the physiological functions. It is possible to establish real disorders of will which are manifested in indolence, irresolution, slowness, enfeebled effort, fatigue, failure of achievement, absence of resistance, misoneism, social aboulia with insurmountable timidity, professional aboulias and inertias of all sorts. One may establish disorders of intelligence which are manifested in amnesias, doubts, arrests of instruction, unintelligibility of perceptions, inattention, reveries, and veritable eclipses of mind. In connection with the emotions one may note indifference, melancholy, need of loving and of being loved, fear of isolation, and a return to childhood.

It is quite probable that depression phenomena similar to those just discussed, and that feelings of imperfection similar to those just summarized, are fundamental to many of the deliriums. In the delirium of persecution there are many phenomena of this sort, along with disturbances which are vaguely designated disorders of the general sensibility, and which characterize the first period of inquietude.

If these symptoms of depression — the motor retardation, the difficulty of apprehension and of association — become aggravated, one finds various forms of melancholia, whose interpretation constitutes an important problem of pathological psychology. Indeed, it is the chief problem as Kraepelin and his pupils have pointed out. Certain of these depressions are definitive and irreparable; they terminate more or less rapidly in one or other of the forms of dementia. Other depressions are transitory and curable. Is it possible to distinguish them, from the outset? That is, at the present time, one of the most important practical problems.

It is a remarkable fact that almost all of the depressions which we have discussed — hysteria, psychæsthenia, as well as melancholia — may under certain circumstances, disappear or

change into the opposite condition. We may designate this change as an excitation in order to distinguish it from the previous agitation which accompanied the depression. A hysterical subject may find herself changed as the result of a crisis, a somnambulism or a suggestion. "I am no longer the same," she says, "I feel new life. My head seems new." She is impressed by the fact that she perceives things much more distinctly than before. "I seem now to see the present objects for the first time. I saw them before, it is true, but they appeared to be in a distant fog. It is only now that I really recognize them." These feelings extend to other functions; it seems to her that she breathes more freely, that her arms and her legs are stronger but at the same time she has a much more intensive feeling of fatigue. The subject's conduct has undergone a complete change; she sets to work; she resumes her trade without ennui and even with interest. She is capable of making whatever coördinations are necessary, while in her previous condition she remained passive and inert for an indefinite period of time. Her sociability and her natural feelings return to full activity. I have elsewhere described changes of this sort in connection with the influence of hypnotism, and the necessity of direction in hystericals.[1]

It is to be noted that these changes appear in exactly the same form in psychæsthenic subjects, as the result of certain emotions, as the result of acts which they have been made to perform, or simply in consequence of exhortation or advice after their confidence has been won. Their disorders of perception, their doubts as to the reality of things and of themselves, disappear and are replaced by feelings of certainty which delight the subject beyond measure. He comes to know himself again, and he experiences deep feelings of emotion, of joy and sorrow, to which he had formerly been a comparative stranger. This change is accompanied in many cases by feelings of joy and delight which it is very important for us to know if we are to understand the mental states of certain religious ecstatics which science is only now beginning to analyze.

I can only indicate the most striking phenomena which I

[1] *Névroses et idées fixes*, 1898, Ch. XI.

have observed in connection with the influence of toxines in determining these periods of excitation. Of prime importance for the theory of these diseases is the fact that the fever induced by an intercurrent disease frequently suffices to cause the disappearance of depression and of all disorders depending upon it. I have called attention to certain curious cases in which the development of phthisis has brought about a cure of mental diseases. Women who have been subject to obsessions or agrophobia for twenty years without interruption, regain their calmness and moral assurance during the last months of their lives, when the progress of tuberculosis induces a slight degree of continuous hectic fever. But what I wish to emphasize here is the simple fact that all the symptoms of depression may disappear and give place to an opposite condition.

This is still more evident in the melancholic states of which we have just been speaking. It is known that melancholia may give place to a state of more or less normal excitation in which many of the preceding phenomena are reversed. This is what the older French alienists (Morel, Baillarger), and more recently Ritti, studied under the name of intermittent insanity, circular insanity, and insanity of dual form. This too is what the German alienists are taking up again under the name of depressive insanity, to which they rightly ascribe a great importance. The physiological and the mental conditions presented by these two contrary forms which alternate in the same individual, were carefully investigated by Dumas in his work on *La tristesse et la joie*. It would, in my opinion, be most desirable to analyze the states of mental excitation with the same care as has been given to the states of depression. It would be well to discover if the apparent exaltation of mind is real, to determine what pathological phenomena it manifests, and to ascertain whether it can, like depression, become the starting-point of delirium. It is at least certain that depressed subjects believe the ascending oscillation to be possible, that they desire it, and that they make every effort to attain it. Many of the impulsions are due to this fact. Dipsomania is in reality a crisis of depression in which the subject feels the need of being excited by means of a poison whose effects he knows only too well, *i. e.*, by alcohol. And there are many impulsions of the same sort.

How are we to envisage these transformations which are still far from being understood? It will suffice to summarize them in the form of a general hypothesis which may serve at once to resume a great many facts, to provoke discussion, and to instigate investigation. The phenomena which we have passed in review testify to the fact that the various functions of the nervous system are not all of equal difficulty. Certain functions are more facile than others, and require a lesser amount of nervous energy for the production of their mental phenomena. These functions seem to be arranged in a hierarchy of increasing degrees of difficulty; for when a nervous system loses or regains its strength, its functions disappear or reappear in a regular sequence. The functions which are the first to disappear are evidently the most complex, *i. e.*, those which are concerned with the synthesizing of a great number of sensations and images. We must therefore take account, as has been done particularly in England since the work of Hughlings Jackson, of the order of development of cerebral centers and cerebral functions. The functions which are the last to be developed in the race and in the individual are evidently the most complex and difficult; they will naturally be most readily affected in fatigue, in sleep, in emotion and in diseased conditions of the nervous system. Finally, I believe that these two notions may be united by the introduction of an additional conception. The mental operations which are at once most difficult of accomplishment and most recent in origin, are those whose function it is to bring the individual into relation with the given reality of the moment. They are most complex because reality is in touch with us at so many points, and most recent because the world about us is constantly changing. Evolution is not a thing of the past alone; we are constantly called upon to adapt ourselves to new situations, and to evolve new organs and new functions as our animal ancestors did in developing to our present condition. Now, one can readily see that it is just the adaptation to the present reality, the reaction upon reality, the feeling and enjoyment of reality, which disappears in all depressions, and which, on reappearing in the subsequent excitations, gives rise to feelings of joy and gladness.

Below these highest functions are to be placed those mental operations which occur when present reality is to a certain extent ignored, and the present reaction consists in an automatic repetition of the past. "I must not pay attention; my work will not proceed satisfactorily if I become absorbed in it." Still lower down, we must place the abstract mental operations; these have to do solely with few and non-complex images, nor are they concerned with new adaptations. It is a mistake to suppose that abstract reasoning, imagining and remembering are the highest mental operations. These are of value only when they are engaged upon the (concrete) present; so soon as they become abstract they cease to be difficult, and prove to be most common-place achievements. A high degree of development of purely representative memory is frequently attained by savages, by children, by the feeble-minded, and by the insane. Still lower down, we would have uncoördinated visceral excitation, such as is present in the emotions, in the uncoördinated motor agitations, in tics and in convulsions.

In short, the mental functions disappear more readily in proportion as their coefficient of reality is higher, and persist longer in proportion as their coefficient of reality is lower. Thus from the point of view of knowledge and of action, or of their correspondence with each other (Spencer), the mental functions constitute a series of decreasing difficulty, according as their relation to reality diminishes. If we consider these conceptions in connection with the philosophical views of Spencer, Höffding, Ribot, and Bergson, they throw light upon many of the observations and experiments of pathological psychology.

They permit us to take our stand upon a first group of facts relating to the lowering of the mental level in various conditions and diseases, and to interpret the changes which attend the various excitations, as a subsequent elevation of the mental level. In short they permit us to regard as mental oscillations, a host of phenomena which fail to find a place within the limits of a system of normal psychology. A psychology which confines itself to the study of normal mankind has a tendency to deal only with immutable and complete conditions. It is to a considerable degree static; it describes man as he ought to be, and

it does so in a definitive manner. It has a fondness for the functions which seem to be invariable, such as reason, representative memory, or the intellect in general. Such important phenomena as those of fatigue are not even mentioned in the older psychologies. Fatigue had no place in the older text-books because it was not regarded as a function; it was only a disorder. The older psychologists were equally at a loss in their discussion of sleep and dreams; these were regarded as mental curiosities and were relegated to an appendix at the end of the volume. And as to the emotions, they were misunderstood to the extent of being made phenomena either of intellect or of pure sensation. Pathological psychology has rehabilitated all these phenomena, and has pointed out their supreme importance. We cannot afford to ignore fatigue, sleep and emotion, since they are typical of all the mental diseases. If we ignore them we must also ignore hysteria, obsessions, melancholia and mania. And what would be left? In my opinion, it was psycho-pathological investigation which introduced into psychology the disposition to pay more attention to the evolution of mind as manifested in the phenomena of mental augmentation and mental diminution. In a word, psycho-pathology has made psychology more dynamic, and it seems to me, has also deepened it, and brought it closer to reality.

This rapid sketch shows us what has been the direction taken by the chief investigations of pathological psychology. We have summarized the results of numerous investigations which have already been made, and have indicated the trend of those that are to come. What problems are set for us to solve by the notion of an oscillation of the mental level? What phenomena are characteristic of the depression and of the reëlevation (excitation) of the level? In other words, what precise position in the hierarchy is occupied by each mental function? A rapid association of ideas, and a development of automatism do not always indicate an elevation. There are agitations which coincide with depressions, and which may be regarded as a sort of derivative. How does the derivation come about? How do the phenomena belonging to a lower level replace a vanished phenomenon of a higher level? What are the characteristics

of excitation, which has been studied much less than depression? What factors determine these two groups of phenomena? How does it come that in different diseases these phenomena appear now in one form, now in the alternate form? What is the mental result of the indefinite prolongation of a state of depression or of excitation? The answers to these questions will doubtless some day help us to solve the difficult problem of the classification of mental diseases. Finally, is it possible to discover therapeutic agents, whether physical or mental, which will act upon the oscillations? Our knowledge upon all of these points is still in a rudimentary stage. But it seems safe to assert that the notion of the elevation of mental levels is beginning to assume a definite form; and that it has opened up to us an important chapter of pathological and of normal psychology.

SOME OF THE PRESENT PROBLEMS OF ABNORMAL PSYCHOLOGY.[1]

BY PROFESSOR MORTON PRINCE,

Tufts College Medical School.

I.

To discuss the present problems of abnormal psychology without acknowledging the debt we owe to the distinguished psychologist who has addressed us to-day would be as impossible as it would be ungrateful. One may be permitted to question whether a section on abnormal psychology would have appeared upon the programme of this congress if Dr. Pierre Janet had not already gone before and opened up this great field of investigation through his brilliant researches. It is not too much to say that as numerous as are the problems awaiting solution, there is scarcely one which has not already been illumined by this investigator's penetrating observations.

In our own country, too, we owe much to Boris Sidis, a patient student and keen investigator of psychological problems, whose researches in the dissociation of consciousness and genesis of hallucinations have given precision to our conceptions of these abnormal conditions. The time at my disposal will not allow me to refer by name to the work of other students, though I cannot forbear calling attention to the great impetus given to the study of this fascinating field of research by the labors of Charcot and of the brilliant Salpêtrière group of scholars who still love to call their old Chief master. Certain problems in subconscious automatism will always be associated with the names of Breuer and Freud in Germany, and Alfred Binet in France. It is encouraging to see the growing interest in this field, and the increasing number of students who are pursuing its problems.

[1] An address delivered before the Section on Abnormal Psychology at the St. Louis Congress of Arts and Science, September 24, 1904.

As a field of research abnormal psychology belongs both to the psychologist and the physician. It has thrown much light on the mechanism of normal mental processes, for disease dissects the mind and brings into view the mechanism of its processes much better than can the introspective study of the psychologist. In the department of medicine it has furnished an intelligible explanation of many previously incomprehensible derangements of the mind and body. With this increase in precision of our knowledge of mental processes it has ceased to be sufficient for the physician to know that an anæsthesia or paralysis or other disturbed function of the body is due to some mysterious mental influence, but medical culture requires that he should know the exact mechanism of this influence. The researches of recent years have furnished this knowledge in many important particulars.

Dissociation and Automatism.

Abnormal psychological phenomena, as phenomena, may be divided into two great groups, according as they are manifestations of (A) dissociations or weakened syntheses of conscious states, or (B) of automatism.

In the first group (A), the dissociations and imperfect syntheses, may be placed the losses of memory (amnesias), the losses of perceptions (anesthesias), the losses of motor functions (paralyses), the alterations of character, the divisions of personality, etc.

The second group (B) the automatisms, would include all those phenomena which are the expressions of an activity beyond the will and control of the personal consciousness and involve abnormal syntheses. It would include the fixed ideas, the hallucinations, the deliriums, the obsessions, impulsions, tics, contractures, convulsive seizures and various perversions of the visceral processes. The automatism may be still further classified according as they are syntheses of dissociated (so-called subconscious) elements, so characteristic of hysteria, or syntheses of the personal consciousness, characteristic of psychasthenic states. Both may exist together.

These two classes of phenomena (A and B) bear a reciprocal

relation to one another, in that pari passu with the development of a weakening of the power of synthesis, or of a complete dissociation, the remaining restricted elements of the personal consciousness, or the dissociated elements, respectively tend to take on automatic activity; as an example, take the obsessions of psychasthenia confined entirely to the personal consciousness, and the hysterical attack due to the automatic activity of dissociated (subconscious) memories of past experiences. And *vice versa*, the development of automatism with its abnormal syntheses tends to induce dissociation, as when an artificially induced idea robs the personal consciousness of its sensory perceptions (anesthesia) or produces retrograde amnesia. Thus in any particular syndrome, such as the hysterical state, or the psychasthenic obsessions, we have combined the manifestations of dissociation or weakened synthesis with those of automatism.

The problems of abnormal psychology become, then, very largely problems of dissociation, weakened syntheses and automatism; and if the laws which govern these processes can be determined, we shall be able to correlate most, if not all, abnormal psychological states. As dissociation and automatism are also principles of normal mental life, as for example, the phenomena of absentmindedness and the artifacts of suggestion, in these same laws we may find a correlation of abnormal psychology with normal psychology. Thus simply as manifestations of, or perverted working of, the normal dissociating and synthesizing process, whether psychical or cerebral, we may find an explanation for and correlate:

1. Physiological states, like
   Sleep,
   Dreams,
   Normal forgetfulness (amnesia),
   Moods,
   Absentminded phenomena,
   Natural somnambulism;

2. Artifacts like,
   Hypnosis and post-hypnotic phenomena,

Motor automatisms; (automatic writing and speech),
Artificial sensory automatisms (crystal visions);

3. Pathological states; such as,
The hysterical state and its manifestations,
Trances,
Obsessions,
Hallucinations,
Deliriums,
Alterations of character,
Multiple personalities,
Epileptoid states, etc.

I think we may also, though perhaps debatably, include certain insane states, like moral and certain forms of circular insanity. It is certain that abnormal phenomena like retrograde amnesia, hysterical anesthesia, hallucinations, alterations of character, etc., do not stand apart as facts without kinship to normal life, for phenomena, which are absolutely identical in form, content and behavior to the environment, whether spontaneous or artificially induced, occur as manifestations of the activity of the health mind. Thus certain types of normal amnesia may in every way give the same reactions, and show the same relations to the personal consciousness as abnormal amnesia; normal absentmindedness as abnormal abstraction; crystal visions as hysterical visions; normal or induced somnambulism as hysterical somnambulism; post-hypnotic suggestion and fixed ideas, automatic writing, and the dowsing-rod as the motor automatisms and fixed ideas of disease. The difference between normal and abnormal dissociated states probably depends upon differences in the lines of disaggregation, psychical and physiological, and not upon the differences of process.

If Virchow's great generalization is true, namely that disease is only life under altered conditions, we may say that the phenomena of abnormal psychology are only the normal processes of the mind and brain submitted to changed conditions. One great vantage point of abnormal psychology is that by altering the conditions at will, as we often can do, we can study

the alterations in the normal processes and thus find out what those processes are.

It has been, indeed, through a study of the abnormal, that is, a study of natural forces under altered conditions, that the physical sciences have received their development. It was by such a study of abnormal phenomena that Galileo was able to demonstrate the laws of inertia and of falling bodies; that Archimedes proved the theory of his lever, and that Pascal demonstrated his hydro-dynamic paradox. In fact, all physical research depends upon the study of abnormal phenomena.

The Mind not a Unity.

One of the great truths taught by abnormal psychology is that while the mind under ordinary conditions is for practical purposes a unity, under altered conditions it may cease to be a unity, and may exhibit multiple activity of a complex sort. It is even questionable whether under habitual conditions it is ever an absolute unity, whether *within certain limitations* it does not always exhibit a certain degree of multiplicity. It remains a problem, which I have thought well worthy of special consideration at this time, to investigate what those limitations are.

Influence of the Mind on the Body.

Again, considered from the two points of view of dissociation and automatism, we are able to approach those puzzling problems which belong to practical medicine and which have long baffled clinical research. From the earliest times to these days of scientific skepticism about the veridity of phenomena which cannot be explained, the influence of the mind on the body for ill or for good has been and is recognized. Its influence for evil is evident in the nervous manifestations which mimic organic disease, in the perverted functioning of the organs of the body, and even in its deleterious effect upon organic pathological processes. Its influence for good, in the dissipation of these same manifestations and perversions through faith cures, fads, modern therapeutic suggestion in its various forms and mental hygiene. The lack of precise knowledge of the psychology of these states and of the modus operandi of

the therapeutic agency employed has given rise to all sorts of pseudo-scientific therapeutic systems (including the misuse of drugs), and to the growth of dogmas, philosophies and religions. The hopeless muddling of even the educated medical mind in this field of abnormal psychology is made manifest by a casual perusal of the standard text-books on medicine as well as the latest monographs on mental therapeutics. In the laws of dissociation, weakened synthesis, and automatism, abnormal psychology offers a basis upon which to support an intelligible explanation of these perplexing phenomena — slight as is our knowledge of the details of these processes. Thus in the automatic activity of subconscious fixed ideas we have a demonstrated casual factor in many so-called hysterical phenomena (attacks, tics, anesthesias, etc.); and in the nervous radiations from these subconscious automatisms down through the lower nervous centers we find the origin of various disturbances of the body, as when subconscious, or partially subconscious, emotional states excite cardiac, vaso-motor, secretory and other visceral derangements.

Hysteria.

The study of abnormal psychology has completely revolutionized our conception of that remarkable disease, hysteria, as much so as the discovery of germs has altered the surgical conception of inflammation. We understand to-day that it is not only a disease of the mind, but more precisely that fundamentally it is a splitting of the personality with or without a doubling of consciousness and automatism. But we are still however entirely in the dark regarding the modus operandi of many of its manifestations. The exact mechanism for instance, by which such phenomena as contractures, epileptiform seizures, and vaso-motor disturbances are brought about, though recognized as dissociated automatism, remains as a problem for the future.

Character.

Another problem which must be approached along these same lines are the modifications of character which occur in diseased conditions like hysteria, particularly that special type

known as disintegrated multiple personality, and in certain psychoses like circular and so-called moral insanity. The lesser states of depression and exaltation as commonly observed in such conditions each accompanied or represented by altered points of view of the individual when closely studied seem not to essentially differ from the similar conditions experienced by normal individuals and called *moods*. These alterations of character can be studied most advantageously in disintegrated personality where they can be watched as they take place under the very eye of the observer. They may include even changes in the physiological reactions, like the effect of alcohol, tobacco, sunlight and the environment, and may or may not be accompanied by alterations of memory. Thus to take an actually observed example, an individual at one one moment amiable, religious, forbearing, the typical saint of literature, one who loves the quiet idealism and subdued light of the cloister and whose moral and physiological tastes lead her to dislike coffee, cigarettes, wine, the glare of sunlight, gaudy fashions of dress and a score of other pleasures of the flesh, becomes suddenly, in a moment of time, strong, resolute, 'quick and sudden in quarrel,' without religious tastes, one who delights in cigarettes, wine, the pleasure of the table, gay fashions of dress and above all in the strenuous Rooseveltian life. More than this the character of an individual of this instability can be modified almost at will by artificial methods, or indirectly through the effect of fatigue and emotion. A certain number of the traits of one state being swapped for those of another and *vice versa*.

Similar alterations of character have been artifically brought about by one experimenter in an individual with an apparently healthy nervous system, five different character states being obtained without changes of memory.

Such phenomena as these raise the problem of what is character, or more specifically what is the fundamental process which brings about the alterations observed in special diseased conditions? The data at our disposal do not allow us to completely answer these questions, but we have enough facts at hand to show that a very large share in the process must be attributed to either psychical dissociation, or incapacity to make

complete syntheses, in consequence of which the 'personal perceptions' are very much restricted.

The fact that the same sort of alterations occur in the profound psychoses, in hysteria, and even in the moods of normal life suggest that all are different types of disaggregation of the field of consciousness and perversions of the same mechanism, though the exciting cause may be different in each case.

The problems of functional dissociation, abnormal syntheses and automatisms belong to those which are fundamental to abnormal and therefore normal psychology. We enter upon more debatable ground when we try to determine the exact nature of these processes and give greater precision to our knowledge. Are the anesthesias, amnesias and other forms of dissociation, for instance, to be classified as held by Dr. Janet as 'failure of personal perception,' that is, simply as special types of normal absentmindedness, or must some physiological principle be invoked. This is a question of interpretation of the observed facts, and it seems to me, is one which we are not in a position as yet to answer definitely, although as I shall later point out we can frame a reasonable hypothesis.

II. Do Subconscious States Habitually Exist Normally, or are They Always Either Artifacts or Abnormal Phenomena?

I have already referred to the doubling of the mind and the formation of subconscious states that may result from this dissociation, even to the formation of a second personality. Now, if abnormal dissociation is only an exaggeration, or perversion of normal dissociation, the question arises, To what extent is there a division of the healthy mind, of such a character as to give it multiplicity? Are the well-known abnormal dissociations and automatisms, the manifestations of abnormal subconscious processes, merely perverted types of similar processes which go on in every healthy mind? This is one of the most pressing problems for abnormal psychology to settle, for the idea that there is a subconscious mental life of elaborate activity and which habitually plays a large part in all our mental processes has received such wide acceptance that it shows evidence of

dominating psychological thought and has even furnished a ground work for a new philosophy. As a problem in dissociation and automatism I propose, therefore, to inquire to what degree this hypothesis is justified by actually demonstrated data in our possession to-day.

The problem may be thus stated: Do subconscious states habitually exist normally, or are they always either artifacts or abnormal phenomena? If they form a part of the normal mind what is the extent of the subconscious field? There is a very wide tendency at the present day to account for a large variety of phenomena, including both normal and abnormal experiences, by what used to be called 'unconscious cerebration' but which now is spoken of as 'subconscious thought' or the 'secondary consciousness.'

Now at the outset, in approaching this problem, we should have a clear idea of what is meant by subconscious ideas and their relation to the personal consciousness. It is difficult to state the theory of a secondary consciousness in a way that will be acceptable to all students, for probably no two observers are agreed as to the interpretation of the facts, or, if the fundamental notion be accepted, whether the theory includes a limited or a large category of facts. All, however, are agreed that, *under certain artificially induced or abnormal conditions*, correlated with our brain processes at any moment of time there may be a certain number of elementary conscious states of whose existence we are ignorant, but which nevertheless coëxist with that habitual waking consciousness which we term ourself, or our own personality.

Now as to the *conditions* under which this secondary consciousness develops, and to its *extent*—the number of sensations, emotions and other psychical states composing it, and above all, the degree to which they are organized into a self-acting system (or personality)—there is considerable difference of opinion, so that there may be said to be several theories of the secondary consciousness, according to the point of view of the writer, and the interpretation given to the accepted facts. While all agree that under *special* conditions every mind may be made up of certain states of which we are conscious and

certain states of which we are not conscious, some think that in *healthy* minds the secondary consciousness — if existent at all — is limited to only a number of more or less dissociated and isolated states, like sensations and perhaps emotions, without being synthesized into a personal self unity, or even self-acting system. Others think that these dissociated states are always woven into a systematized unity and are capable of considerable intellectual and independent activity. Some think that these secondary states play but a small subordinate part in our mental lives; others think that they have a very large share in our daily acts, particularly in those acts to which we do not give our conscious volition (habit acts, absent-minded acts, etc.). Still others seek to explain our highest intellectual feats through this secondary consciousness. It will be borne in mind that we are now speaking of normal healthy minds. In diseased minds it is agreed by all that the psychical states making up this secondary consciousness may become highly organized into a self-acting system and become capable of playing a rôle almost as controlling and independent as the habitual self. But some (Janet) think a doubling of consciousness is always a sign of disease.

Now subconscious ideas are dissociated ideas — dissociated from the main system of ideas which make up the personal consciousness. They are thrown off, so to speak, as satellites may be supposed to be thrown off from their planet. The term 'subconscious' is an unfortunate one for it is metaphorical, and, while descriptive does not precisely express the true relation of these ideas to the personal consciousness. Extra-conscious, concomitant or better, dissociated, are more exact terms. Now being dissociated from our personal consciousness, we are ignorant of them. Our knowledge of the existence of such dissociated mental states is largely derived from a study of pathological and artificially induced conditions, where their presence can be positively and accurately determined. The researches of recent years have proved very conclusively not only that the mind may be split in two in such a way that certain groups of ideas may be dissociated from the main consciousness, but that a number of these dissociated states may become synthesized

among themselves and that in this way is formed a second consciousness, capable of a certain amout of activity. This activity may be manifested contemporaneously with that of our personal consciousness. There is then a doubling of consciousness. The mind becomes dual. Thus in the subject of disintegrated personality just referred to, known as The Misses Beauchamp, a secondary group of dissociated states has existed for many years contemporaneously with the personal consciousness. These secondary states are so extensive and are so well organized into a personality that I have been able to obtain an autobiography of the subconscious life of this concomitant personality, disclosing a mental life running along side by side with, but unknown to, the personal self from childhood to the present day. The subject is twenty-eight years of age. Similar though less extensive manifestations of a double life are common as phenomena of hysteria. In the automatic writing and speech of mediums and of psychological experiment, in the dowsing rod, in so-called post-hypnotic phenomena, and in the automatic acts of artificial and spontaneous abstraction, we have the same manifestations of the splitting of the mind and the formation of an extra-conscious self of which the personal consciousness is ignorant. The dissociated states may or mav not take on contemporaneous activity. If they do so the secondary phenomena thus produced are called *automatisms* as they occur outside the cognition of the personal self. They form the subconscious fixed ideas of hysteria now so well known. When the dissociated ideas include the kinesthetic and sensory spheres we have hysterical paralyses and anesthesias. At times these dissociated ideas break out in insurrections, kick up didos and turn our peaceful mental arrangements topsy-turvy. We then have the hysterical attack.

Now allowing for such differences of opinion as have been already stated there still seems to be a tacit acquiescence on the part of many psychologists in the theory that in normal healthy minds similar dissociated ideas of greater or less complexity have their place and play a well-regulated part in the mental economy. In other words, according to this theory the normal mind is not a unity any more than the hysterical mind. It re-

quires but a slight extension of this theory to assume as some do that these dissociated mental states become normally synthesized into a second consciousness of considerable intellectual capacity, which takes part in our every-day intellectual processes. In every mind the activity of the primary consciousness is supposed to be accompanied by that of a secondary consciousness. On the basis of actually substantiated data one would think that this was as far as the hypothesis could be logically carried, but the fact that we are not conscious of dissociated ideas gives a certain mysticism to their existence and has offered a temptation to still further extend the hypothesis until in the hands of certain of its advocates it has outgrown even all demonstrated pathological facts. The subconscious ideas, instead of being mental states dissociated from the main personality, now become the main reservoir of consciousness and the personal consciousness becomes a subordinate stream flowing out of this great storage basin of 'subliminal' ideas as they are called. We have within us a great tank of consciousness but we are conscious of only a small portion of its contents. In other words, of the sum total of conscious states within us only a small portion forms the personal consciousness. The personal self becomes even an inferior consciousness emerging out of a superior subliminal consciousness present in a transcendental world, and this subliminal consciousness is made the source of flights of genius on the one hand, while it controls the physical processes of the body on the other. It is hardly necessary to follow this new 'tank' hypothesis into its different applications. I merely refer to it as it has unquestionably colored the orthodox conception of subconscious ideas. Thus Professor Stout,[1] while contending against this doctrine, himself apparently influenced by it, postulates normal dissociated states (he adopts the term 'subliminal') and gives them functions of wide scope.

"Consider," he says, "the process of recollecting a name. * * * It may happen that we fail to revive the name while we are trying to do so, and that it suddenly emerges into consciousness after an interval during which we have been occupied with other matters, or have been asleep. This implies that our conscious effort has set going a subliminal process which continues after the conscious effort has ceased."

[1] *The Hibbert Journal*, October, 1903.

Professor Stout then goes on to argue that our conscious process has a way of exciting these dissociated states into trains of thought of which we are wholly unconscious and which solve our problems for us while we attend to other things.

> "In such cases" [solving problems], he says, "conscious endeavor to find an ideal combination which shall satisfy certain conditions serves only to set in operation subliminal processes which may or may not yield the requisite result. Here also the process may continue after the consciousness which prompted it ceased. The ordinary man, no less than the man of genius, may find that what relatively to *him* are original ideas develop while his thoughts are occupied with disconnected topics, or even while he is asleep. In general we take an utterly false view of mental construction when we regard it is a mere putting together of data already present in consciousness analagous to the putting together of the parts of a puzzle spread out on the table before us."

It seems to me that these are pure assumptions. As far as my own conscious experience goes I am compelled to agree with Mr. Andrew Lang[1] in that as 'an ordinary man' I do not find that my conscious activity appeals to 'anything else' but my own conscious processes, or that I am conscious of any such easy way of settling my own problems. As an ordinary man I do not find I can rely upon any other consciousness to write this address but the thoughts which I laboriously elaborate.

This theory of the normal occurrence of subconscious dissociated thought seems to have arisen as an interpretation of certain well-known, but exceptional, spontaneous experiences of the kind which Professor Stout accepts as evidence of normal subconscious mental activity, but the theory has a more substantial basis in data which have been obtained through direct objective experimentation. These include (1) various hysterical phenomena, (2) hypnotic experiments, (3) various motor automatisms, particularly automatic writing, and (4) phenomena of absentmindedness or abstraction. A critical analysis of these data will show that they do not permit of inferences applicable to normal and habitual conditions.

1. That secondary subconscious states, capable of being synthesized into a self, may be developed by disease is a well-attested observation. But, being pathological, they are evidence only of the abnormality of subconscious states.

[1] *The Hibbert Journal*, April, 1904.

2. As to hypnotic states, it is sometimes assumed that the hypnotic self represents a persistent consciousness having a continuous existence after the awakening of the personal consciousness. There is no evidence for this. The hypnotic self is a dissociated state of the waking consciousness. On awaking the synthesis of the original self is again made and the hypnotic dissociation ceases to exist. Nor is there any particular hypnotic state. There may be almost any number of such states in the same individual — as many as there are possible states of dissociation. In the second place, hypnosis is an artifact — an artificial dissociation, not a state of normal life. The phenomena of post-hypnotic suggestion, which are entirely phenomena of subconscious processes, are likewise artifacts, produced by the methods of the experiment. They prove that the mind may be artificially made to exhibit duality but not that this is true of normal mental life.

3. As to the evidence from automatic writing and similar phenomena, it seems to have been overlooked that these phenomena too are artifacts. Although they are plainly manifestations of dissociation of consciousness and automatism of the dissociated elements, nevertheless this dissociation is the product of the conditions of the experiment. Abstraction, which means dissociation of a greater or less degree, is induced and suggestion directly excites the phenomena. But all such experiments have great significance in another respect. The ease with which the mind, in perfectly healthy persons, can be dissociated and the dissociated states synthesized into an autonomous system shows that subconscious synthesized states are not always evidence of disease, as maintained by Janet, though they may be artifacts, but that the whole is dependent upon a physiological process. When a physiological stimulus, like the mere sound of a spoken word, a suggested idea, is capable of inciting a dual activity of the mind in healthy university students the process is unintelligible, unless it is psycho-physiological, that is to say, a normal reaction of the mind to specially devised stimuli. When critically examined, then, the experimental evidence, which is relied upon to establish subconscious ideas as normal processes of mentation, is found to be fallacious.

The resulting phenomena are made subconscious by the very conditions of the experiment. For this reason the problem is impossible to solve by the usual experimental methods. There is, however, some experimental evidence of a different sort which may be utilized, and which I propose presently to point out.

4. The phenomena of absentmindedness, or abstraction, a normal function, indicate both dissociation and automatism. It is not difficult to demonstrate experimentally that auditory, visual, tactile and other images, which are not perceived by the personal consciousness during this state may be perceived subconsciously. Thus, under proper precautions, I place various objects where they will be within the peripheral field of vision of a suitable subject, C. B. Her attention is strongly attracted listening to a discourse. The objects are not perceived. She is now hypnotized and in hypnosis describes accurately the objects, thus showing that they were subconsciously recognized. It is the same for auditory perceptions of passing carriages, voices, etc. Likewise, on the *motor* side the numerous absentminded acts of which we are not conscious show intelligent subconscious automatism. C. B., in hypnosis, remembers each step of such an act (putting away a book in the book case), of which she is completely oblivious when awake. This duality of the mind in normal absentmindedness has been pointed out by various observers. Its phenomena simulate those of artificial abstraction as they occur in automatic writing and hysterical states. There is nothing surprising in this as the term "absentmindedness" means dissociation of consciousness — a failure to perceive that which before was perceived, and a failure to be conscious of acts intelligently performed. On the other hand, normal absentmindedness is a distinctly special condition. We don't go about in an absentminded state, or as if we had lost our heads, when we have work to be done. Absentminded phenomena are manifestations of the temporary disintegration of the personal self, and doubling of consciousness, but not evidence of the persistence during the ordinary waking life of subconscious states. It does not follow that on waking from revery complete synthesis does not take place. But here the significant fact, the most significant of all, should

not be lost sight of, that in the normal process of abstraction we find evidence of the existence of a normal prearranged mechanism for dissociating consciousness and producing subconscious states. Dissociation is plainly a function of the mind or brain.

Now, the nub of the problem is, in healthy persons are these subconscious states limited to absentmindedness? and, if not, what part do they play in the mental economy? Indeed, whether so limited or not, what is their extent? *i. e.* (*a*) Are they purely isolated phenomena, isolated sensations and perceptions? or (*b*) Are they synthesized, as imagined by Professor Stout into logical subconscious processes of thought, capable of sustained action, and as imagined by some sufficiently complex to form a personality — something that we are justified in calling a subconscious self? or (*c*) Are subconscious states when synthesized always either artifacts or pathological?

The question is at the root of many important problems in abnormal psychology, but is difficult to answer by experimental methods, owing to the danger of artifacts. In illustration of this danger I may point to the phenomena of subconscious solution of arithmetical problems which are sometimes cited in evidence. In favorable subjects, as in an instance under my own observation, it is not difficult by means of suggestion in hypnosis to obtain the solution of arithmetical problems during the waking state by some other consciousness than that of the waking personality. For example, while in hypnosis, two numbers are given to be added or multiplied, say $453 + 367$, or 4326×3, to take actual examples, and the subject waked instantaneously the moment the last figure is given. The addition or multiplication is correctly solved subconsciously, the subject not having any conscious knowledge that any task whatever has been set. The exact method of mentation by which the problem is extraconsciously solved is learned by catechizing the hypnotic personality. But such experiments are plainly artifacts. The dissociation and automatism are the products of suggestion. The results are of value, however, as cannot be too often insisted upon, in that they show the ease with which duality of the mind may be effected by what is plainly a psycho-physiological stimulus, a suggested idea. But to obtain subconscious phe-

nomena free from artifice such phenomena must be *spontaneous.* Information regarding the presence and character of subconscious states at any given time can be easily obtained owing to the well-known fact that ideas[1] dissociated from the personal consciousness awake may become synthesized with this same consciousness in hypnosis and then be remembered. A person in hypnosis may thus be able to analyze and describe the ideas which were spontaneously present as an extraconsciousness when awake, but which were not then known to the personal consciousness. This method is far more accurate than the device of tapping the subconsciousness by automatic writing though the same in principle. I am obliged here to refer to a series of observations of this kind which I have personally made with a view of obtaining light upon this question, as I know of no others that have been limited to spontaneous phenomena and are not open to the objection of artifacts. A systematic examination[2] was made of the personal consciousness in hypnosis,

[1] This word is used as a convenient expression for any state of consciousness.

[2] I have adopted this custom of treating the hypnotic self as a sane consciousness, instead of a freak affair, fit only to be played with and to be made to perform all sorts of antics. I am certain this method of study will throw more light on the composition of normal consciousness than that of inducing hallucinations and other artifacts. The hypnotic self if treated like a reasonable being, will be found able to give important information. It knows the waking self, it knows its own thoughts, and it knows the thoughts of the secondary consciousness. It can give very valuable information about each. On the other hand, it is very easily disintegrated by suggestion; and ideas, hallucinations, and what not, are very easily created in it. Experiments of this latter kind have their use, but for the purpose of learning the mode of the working of the normal mind a still greater advantage is to be obtained by treating it as a rational consciousness, capable of accurately observing and imparting information derived from its own experiences.

I would here insist that it is a mistake to confuse the personal consciousness in hypnosis with the secondary consciousness when such exists. They are not identical or coextensive. A hypnotic self, as ordinarily observed, is still the personal consciousness, but in hypnosis the previously dissociated states are synthesized with this self and remembered. The whole becomes then a unity, and the hypnotic personal consciousness remembers the formerly dissociated ideas and its own and speaks of them as such. This has given rise to the wrong interpretation that identifies the hypnotic self with the secondary or subconsciousness. But the hypnotic self includes a large part of the waking personal self. On waking, this part regains the rest of its own syntheses and loses the second states. A failure to recognize these facts has led to much confusion in interpreting abnormal psychological phenomena.

regarding the perceptions and content of the secondary consciousness during definite moments, of which the events were prearranged or otherwise known, the subject not being in absentmindedness. It is not within the scope of an address of this sort to give the details of these observations, but in this connection I may state briefly a summary of the evidence, reserving the complete observations for future publication. It was found that —

1. A large number of perceptions — visual, auditory, tactile and thermal images, and sometimes emotional states — occurred outside of the personal consciousness and therefore the subject was not conscious of them when awake. The visual images were particularly those of the peripheral vision, such as the extra-conscious perception of a person in the street, who was not recognized by the personal waking consciousness; or the perception of objects intentionally placed in the field of peripheral vision and not perceived by the subject, whose attention was held in conversation. Auditory images of passing carriages, of voices, footsteps, etc., thermal images of heat and cold from the body, were similarly found to exist extra-consciously, and to be entirely unknown to the personal waking consciousness.

2. As to the content of the concomitant (dissociated) ideas, it appeared by the testimony of the hypnotic self, that as compared with those of the waking consciousness the secondary ideas were quite limited. They were, as is always the experience of the subject, made up for the most part of emotions (*e. g.*, annoyances), and sensations (visual, auditory and tactile images of a room, of particular persons, people's voices, etc.). They were not combined into a logical proposition, though in using words to describe them it is necessary to so combine them and therefore give them a rather artificial character as 'thoughts.' It is questionable whether the word 'thoughts' may be used to describe mental states of this kind, and the word was used by the hypnotic self subject to this qualification. Commonly, I should infer, a succession of such 'thoughts' may arise, but each is for the most part limited to isolated emotions and sensorial images and lacks the complexity and synthesis of the waking mentation.

3. The memories, emotions and perceptions of which the subject is not conscious when awake are remembered in hypnosis and described. The thoughts of which the subject is conscious when awake are those which are concentrated on what she is doing. The others, of which she is not conscious, are sort of side thoughts. These are not logically connected among themselves, are weak, and have little influence on the personal (chief) train of thought. Now although when awake the subject is conscious of some thoughts and not of others, both kinds keep running into one another and therefore the conscious and the subconscious are constantly uniting, disuniting and interchanging. *There is no hard and fast line between the conscious and the subconscious, for at times what belongs to one passes into the other, and vice versa.* The waking self is varying the grouping of its thoughts all the time in such a way as to be continually including and excluding the subconscious thoughts. The personal pronoun 'I,' or, when spoken to, 'you,' applied equally to her waking self and to her hypnotic self, *but these terms were not applicable to her unconscious thoughts, which were not self-conscious.* For convenience of terminology it was agreed to arbitrarily call the thoughts of which the subject is conscious when awake the *waking consciousness*, and the thoughts of which when awake she is not conscious the *secondary consciousness.* In making this division the hypnotic self insisted most positively on one distinction, namely, that the secondary consciousness was in no sense a *personality.* The pronoun *I* could not be applied to it. In speaking of the thoughts of this second group of mental states alone, she could not say 'I felt this,' 'I saw that.' These thoughts were better described as, for the most part, unconnected, discrete sensations, impressions and emotions, and were not synthesized into a personality. They were not therefore self-conscious. When the waking self was hypnotized, the resulting hypnotic self acquired the subconscious perceptions of the second consciousness, she then could say '*I*,' and the hypnotic '*I*' included what were formerly 'subconscious' perceptions. In speaking of the secondary personality by itself, then, it is to be understood that self-consciousness and personality are always ex-

cluded. This testimony was verified by test instances of subconscious perception of visual and auditory images of experiences occurring in my presence.

4. Part played by the secondary consciousness in (*a*) normal mentation. The hypnotic self testified that the thoughts of the secondary consciousness do not form a logical chain. They do not have volition. They are entirely passive and have no direct control over the subject's voluntary actions.

(*b*) Part played by the secondary consciousness in absentmindedness. (1) Some apparently absentminded acts are only examples of amnesia. There is no doubling of consciousness at the time. It is a sort of continuous amnesia brought about by lack of attention. (2) In true absentmindedness there does occur a division of consciousness along lines which allow a large field to, and relatively wide synthesis of the dissociated states. The personal consciousness is proportionately restricted. The subconscious thoughts may involve a certain amount of volition and judgment, as when the subject subconsciously took a book from the table, carried it to the bookcase, started to place it on the shelf, found that particular location unsuitable, arranged a place on another shelf where the book was finally placed. No evidence, however, was obtained to show that the dissociated consciousness is capable of wider and more original synthesis than is involved in adapting habitual acts to the circumstances of the moment.

(*c*) Solving problems by the secondary consciousness. So much is to be found in the literature about subconscious solutions of problems that the following testimony of the hypnotic personality is of interest:

"When a problem on which my waking self is engaged remains unsettled, it is still kept in mind by the secondary consciousness, even though put aside by my waking self. My secondary consciousness often helps me to solve problems which my waking consciousness has found difficulty in doing. But it is not my secondary consciousness that accomplishes the final solution itself, but it helps in the following way. Suppose, for instance, I am trying to translate a difficult passage in Virgil. I work at it for some time and am puzzled. Finally, unable to do it, I put it aside, leaving it unsolved. I decide that it is not worth bothering about and so put it out of my mind. But it is a mistake to say that you put it *out* of your mind. What you do is, you put it *into* your mind: that is to say, you don't put it out of your mind if the problem remains unsolved

and unsettled. By putting it *into* your mind I mean that, although the waking consciousness may have put it aside, the problem still remains in the secondary consciousness. In the example I used, the memory of the passage from Virgil would be retained persistently by my secondary consciousness. Then from time to time a whole lot of fragmentary memories and thoughts connected with the passage would arise in this consciousness. Some of these thoughts, perhaps, would be memories of the rules of grammar, or different meanings of words in the passage, in fact, anything I had read, or thought, or experienced in connection with the problem. These would not be logical connected thoughts, and they would not solve the problem. My secondary consciousness does not actually do this, *i. e.*, in the example taken, translate the passage. The translation is not effected here. But later when my waking consciousness thinks of the problem again, these fragmentary thoughts of my secondary consciousness arise in my mind and with this information I complete the translation. The actual translation is put together by my waking consciousness. I am not conscious of the fact that these fragments of knowledge existed previously in my secondary consciousness. I do not remember a problem ever to have been solved by the secondary consciousness. It is always solved by the waking self, although the material for solving it may come from the secondary. When my waking consciousness solves it in this way the solution seems to come in a miraculous sort of way, sometimes as if it came to me from somewhere else than my own mind. I have sometimes thought, in consequence, that I had solved it in my sleep."

The subject of these observations was at the time in good mental and physical condition. Criticism may be made that the subject being one who had exhibited for a long time previously the phenomena of mental dissociation, she now, though for the time being recovered, tended to a greater dissociation and formation of subconscious states than does a normal person, and that the subconscious phenomena were therefore exaggerated. This is true. It is probable that the subconscious flora of ideas in this subject are richer than in the ordinary individual. These phenomena probably represent the extreme degree of dissociation compatible with normality. And yet, curiously enough, the evidence tended to show that the more robust the health of the individual the more stable her mind, the richer the field of these ideas. However this may be the very exaggerations increase the value of the evidence for the limitation of the extent, independence and activity of the subconscious states. If in such a subject we do not find, as is the case, evidences of subconscious automatism, excepting in absentmindedness, it is highly improbable that such activity exists in a perfectly healthy subject.

These observations are only suggestive, not conclusive. To solve the whole problem of concomitant, extra, or subconscious states, further and numerous observations are required, but conducted under conditions which shall exclude artifacts and abnormal states. It is interesting, however, here to notice that the direct evidence derived from these observations confirms the theoretical scheme of personal perception offered by Dr. Janet. That scheme is almost a literal representation of the facts as obtained by this method of experimentation.

Summarizing all the evidence which is at our disposal to-day, derived from actually observed facts, we may say, that *while a greater or less number of isolated dissociated states are constantly occurring under normal conditions, there is no satisfactory evidence that they normally become synthesized among themselves and exhibit automatism excepting in states of abstraction and as artifacts.*

A study of subconscious states is highly important for the determination of the mechanism of consciousness, and I am convinced that such studies will throw much light upon the problem of how we think.

At this time considering the fundamental importance of the problem of the subconscious, it has seemed to me wise to stop and review the evidence for the existence of normal dissociated mental states, and this for the further reason of the enormous part which these states play in pathological conditions and because of the credence which has been given to the theory of a normal subconscious self.

If the foregoing review is sound, it would seem that great caution is required in applying the inductions derived from a study of abnormal subconscious phenomena to normal conditions, and that the tendency has been to attribute too extensive a field and too great capabilities to this hidden mental life. The facts at our disposal do not support the hypothesis of a normal subconscious mind excepting within very strict limitations.

Nature of the Dissociating Process.

But the problem of the subconscious brings into stronger relief the still broader problem. What is the nature of the dis-

sociating process by which the duality is brought about? Is the explanation to be found in psychical or in physiological laws? It was a great advance to show, as has been done, that a large number of abnormal functional phenomena like anesthesia, amnesia, paralysis, aboulia, are all different types of the splitting of consciousness. They must, therefore, be due to some dissociating process. Janet interprets these different mental conditions as *chronic forms of absentmindedness*, a persistent failure of the personal consciousness to make more than a few syntheses. This failure is the consequence of exhaustion. The dissociation is, therefore, primary and the resulting automatism secondary. Janet is careful to point out that this is not an explanation. It is in fact only a classification. Breuer and Freud on the other hand would make the dissociation secondary to the development of what they call the hypnoid state, a group of fixed ideas, which are unable to make the synthesis with the personal consciousness.

None of these theories are satisfactory as explanations. Absentmindedness is not only insufficient as an explanation of the process, but even as a classification fails to take into account the differences in phenomena, such as the dissociation brought about as artificial abstraction by merely whispering in the subject's ear. I whisper in the ear of BIV and straight way she does not hear but inquires, 'Where have you gone to?' I speak aloud and she hears again. (The whispered voice is of course heard by a momentarily dissociated group of states which respond.) Why if this phenomenon is the same as absentmindedness, and is due to exhaustion, can not the 'personal perception' (Janet) synthesize the whispered voice as well as the conversational voice? Again multiple personalities with alternating memories are not exhausted, but can make any amount of other syntheses, including their own respective memories: Why not also with the lost memories of another personality? There is not a failure of *perception* of the ego, but a splitting of the ego itself. What has produced it?

Any theory to be sufficient must take into consideration all the facts not only of abnormal but of normal dissociations, including those artificially induced by experimental devices (sug-

gestion, automatic writing, etc.) When we do this we find in the first place, as already pointed out, facts indicating a normal process for dissociating consciousness, through which process normal and abnormal phenomena may be correlated. Normal absentmindedness, certain types of normal amnesia, sleep, spontaneous somnambulism, hypnosis, etc., can experimentally be shown to be types of dissociation, splitting of the ego, differing from one another in the extent and pattern of the fields of consciousness remaining to the personal ego. The process which brings these states about is probably fundamentally the same as that governing the abnormal splitting of consciousness.

In the second place a study of abnormal and induced dissociation shows that, while normal syntheses and automatisms largely follow psychological laws, the lines of *disaggregation* do not follow the lines mapped out by these laws. For instance they do not follow the boundaries of associated ideas.

The hand that performs automatic writing becomes anesthetic though the subconscious ideas which control the hand have nothing to do with tactile sensation. A subconscious fixed idea of fear of personal injury robs the personal consciousness of our subject M——l[1] of perceptions from the peripheral field of vision and from one half of his body. In another subject all the memories for a certain epoch in her life disappear in consequence of a shock. An emotional shock in A. P. excited by a slight fall during a high kicking act robs the personal consciousness of the power to move the arm and leg which are rigid in contracture. In Madam D. a subject of Charcot and Janet continuous amnesia for each succeeding moment of the day follows the announcement of a bad piece of news. There are no psychological associations in any of these examples between the ideas and the resulting dissociations, and psychologically we can find no reason why sensory and motor images are dissociated in one case, and memories in another. It would seem from the points of view of our present knowledge that we shall have to look for an explanation in some physiological process. All must admit that the final explanation must be in

[1] *Boston Medical and Surgical Journal*, Vol. Cl., No. 25, pp. 674–678, June 23, 1904.

terms of the neuron, in the dissociation of the as yet unknown neuron systems which are correlated with the psychological systems. But without attempting such an explanation, what I wish to point out is that the data of abnormal psychology go to show that the psychological disaggregation does not follow as much psychical as physiological lines. The cleavage is brought about by psychological influences — trauma — (ideas, emotions, etc.) but when the fracture occurs, it tends to follow the physiological map. Just as when a blow shatters a mineral, the lines of fracture follow the natural lines of crystallization, so, while a psychical trauma shatters a psycho-psychological system, the cleavage follows very closely the neuron association systems.

Thus when Louis Vivé passed into one state in which he had left hemiplegia, into another in which he had right hemiplegia, another with paraplegia, each with its own group of memories, the alterations can only be explained on the ground that these states were determined by some sort of physiological dissociating system. Likewise, when our subject M——l developed a complete amnesia for the English language, and understood and spoke only German, if we take into account all the phenomena, it would seem this amnesia was determined by physiological dissociation excited by a primarily conscious and later subconscious fear of injury.

Sally Beauchamp's general anesthesia is in no way the result of ideas psychologically in association with it. When BI and BIV exhibit a complete amnesia for each other's lives and exhibit their contradictory traits of character and physiological reactions, it must be because different neurons are brought into activity in each case.

BIV in hypnosis while slightly groggy from ether, talks intelligently and narrates the history of an adventure of the preceding day. I suggest to her that she shall open her eyes, wake up and be herself, a suggestion I have given a hundred time successfully. She opens her eyes and straightway she does not know me, or her surroundings, or who she herself is. An enormous dissociation of psychologically associated ideas has taken place, whether as the effect of the ether or some other

cause, I do not know, but according to psychological laws her syntheses should have been enlarged. I close her eyes again and she regains intelligence, remarking that — 'when my eyes are open I do not know who I am.'

On the other hand automatism and abnormal *syntheses* seem be be affected largely by psychical laws, particularly that of the law of association of ideas. Abnormal psychology then points strongly to the conclusion that there is a normal physiological dissociating mechanism which is the function of the nervous organization. It is this mechanism which brings about such spontaneous normal states as absentmindedness, sleep, normal induced states, like hypnosis; and through its perversions the dissociations underlying abnormal phenomena.

SKETCH OF THE HISTORY OF PSYCHOLOGY.[1]

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The science of psychology essentially reflects in its development the way the human mind has been able at various epochs to apprehend itself. The thought of any object is simply the conscious construction of that object; and this is as true of the sort of object — the mind — with which the science of psychology deals as of the object of any other science. As long, for example, as animistic views prevailed, a thoroughgoing positivistic treatment of the objective world was impossible; for the object constructed was not subject to regular law nor continuity of transformation and change. So also, as long as the animal body was considered an exception to the positivistic process, biology could not be a thoroughly developed natural science; for its object was a center of capricious and mystically motived changes. This is true of psychology, and more emphatically. For the object of the science of psychology is the mind, the object which it constructs from its own experience; that is, its object is just its own positive view of itself. We are accordingly led to see that the history of psychology is the history of the stages or modes of the evolution of reflective consciousness of self.

I. Greek Psychology.

The evolution of psychological views among the Greeks is capable of fruitful interpretation from this point of view. The earliest views were necessarily those possible at a period at which the dualism of mind and body — self and external world — had not been achieved. The so-called 'materialists' of Greece — who, just for the reason now given, would better be called 'protists,' 'pro-noïsts,' 'projectivists' (I shall use this last term), or something of like import — looked upon nature

[1] Read at the Congress of Arts and Science, St. Louis.

as the 'one,' 'the undefined,' a moving labile object (water, air, etc.). And it is characteristic of their views that they did not — because they could not — go on to make distinctions and differentiations in the lines of later more mature reflection. The period of their thinking in the history of opinion corresponds to the early a-dualistic or 'projective' period in the individual's personal development. The individual has a certain objective mass of material, 'protoplasmic' in a figure, in which the dual reference to subject and object is not yet attained. The world, to such an individual, is one of 'first-appearance' — not of matter and mind, nor of anything else which gives an antithesis of poles of reference. So the early thinking of the race was in this sense unreflective. The process of its theoretical interest did not lay apart its material in substantial categories; but it answered the question 'what?' by the assertion of the sort of predicates which were its possible objective constructions at that stage.[1]

The positive character of this first period, however, shows the transition motive to certain later dualisms: the character of animation, movement, change. In this respect, the Ionics suggest a further movement in the child's development. The immature reflection of the individual finds, in the perception of animation and capricious movement, the road toward a solidified and concreted dualism. Through this type of reflection the world-circle closes in somewhat upon the personal center. It neglects the fixed, changeless, inanimate things of the world, as in so far unexistent or hypothetical. In respect to them, the senses deceive. So in the thought of Heraclitus and Parmenides the becoming or change principle played its rôle, and the Greek mind began its career toward a form of dualism in which the 'fixed was of logical or contrast value, mainly, not an objective category.

[1] This is not to say that the adult person himself — for example, such a thinker as Thales — was not self-conscious, and did not deal practically with the problem of self *vs.* things; but only that, in his reflection, he did not segregate the elements of his one general experience in explicite dualisms, nor consider the objects in the two spheres of practical experience as separate and distinct.

It may be explained here that I use the term 'object' (and its adjective form 'objective') of *any cognitive construction whatever* — anything that may be known or thought about.

In this general epoch, the 'projective,' in the development of Greek thinking, we must place also the νοῦς principle of Anaxagoras. It was a principle in the line of the vitalistic or change hypothesis; and it remained, indeed, only a postulate of order, movement, immanence in the world. It was not a subjective, nor yet an objective (a-subjective) principle. So far as it implied a dualism, it was one — that predominant one in Greek thought — of matter and form, not of subjective and objective. It may possibly be considered as in so far an unreflective anticipation of Aristotle's biological point of view — so much indeed is possible — but it was not in any sense an anticipation of the subjective point of view from which a science of psychology could isolate its peculiar matter. This accounts no doubt for its unfruitfulness in later thought.

The real isolation of the subjective or 'inner' seems to have begun with the Atomists, Leucippus and Democritus, in their famous doctrine of the relativity of the sense qualities.[1] This intuition led perforce, just as the same type of phenomena — the relativeness and deceptiveness of qualities, colors, odors, etc., in things — leads the child, to the wider question whether the 'inner' is not a sphere to be distinguished from the 'outer.' Indeed in Democritus this antithesis is actually and fruitfully made. His other great doctrine, that of the 'atoms,' was thus made possible, and has remained possible for all time; for by definition the 'outer' had to be stripped of those relative and ambiguous predicates which had embarrassed earlier speculation. The atoms could do their work in the body of external reality; and the mind could do its separate work of knowing that reality. This was a real advance upon the doctrine of 'elements' as held by Parmenides and Empedocles.

The subjective postulate thus once arrived at in the individualistic sphere of sensation, was to be carried out in the general sphere of truth by the Sophists; indeed it was forced upon them by the social and intellectual conditions which made men Sophists in their generation. In the Sophists began the play of certain forces akin to those which we find enormously germinal in the narrower sphere of the individual's personal growth. And in this our present method has further justification.

[1] Cf. Gomperz, *Greek Thinkers*, Vol. I., pp. 320 ff.

The growing consciousness of personal quasi-subjective detachment from the world of impersonal things, comes to the child through processes analyzed variously into motives of conflict, imitation, invention, discussion (and from the psychic point of view, introjection, absorption, realization) — a give-and-take or dialectical process between the individual and his fellows. In it all the essential fact of subjectivity in the actor's thought of himself and others, comes to birth. The actor becomes an agent; the observer, a creature of reflection; the spontaneous thinker, a possible amateur psychologist.

All this appears, there can be no doubt, in the Sophistic movement; and out of it indeed, the first race-psychologist was born — Socrates. In the views and methods of Socrates are focussed the rays which are to burn inward to the core of the human self. This appears true of Socrates in the following precise points.

1. The Sophistic principle *homo mensura omnium* (Protagoras), formulates the thought of an active and constructive center in the individual. The individual's or human nature's reaction to the world gives all the measure there is for things. In Socrates this principle was developed in an anti-individualistic or social sense.[1]

2. The contrast between 'opinion' (δόξα) and 'reason' (νοῦς), sharply brought out by the dialogue method in the hands of the master, Socrates, and developed by his disciples, now becomes more positive.

3. The view that truth is in general a thing of thought in-so-far eternal and immutable — not, as in the earlier transition stage, a function of a principle of change essentially indetermi-

[1] Against the individualistic interpretation for the Sophists generally, especially Protagoras, see Gomperz, *loc. cit.* I, 451 ff.

It is confirmatory of the parallel made in the text between the Sophist's and a stage in the individual's thought to note that Socrates' position was not in its nature individualistic, but was reached and maintained in the midst of social opposition and discussion. The Socratic method was a social dialectic or give and take. I do not know of any adequate exposition of the social — political, religious, etc. — factors which produced the Sophistic movement; but an account of a later analogous period — the rise of the Post-Aristotelian schools — is given in admirable terms by Caird in his *Development of Theology in the Great Philosophers*, II., Lect. XV.

nate in character. This is the germ of Plato's 'idea' in which reality becomes explicitly an ideal postulate.

4. In Socrates the way is opened to the form of dualism of mind and matter found in Plato's doctrine of matter (ὕλη).

Not stopping to develop these points — time does not allow — we may still say that Socrates was mainly a Sophist, not a clear subjectivist. He reached subjectivism only so far as it was involved in a dualism of the general (truth) and the particular (appearance), and that in an experimental and controversial way.[1] He did not realize the thought of mind as a psychic content in distinction from body.

Had Plato been possessed of the scientific interest this distinction might have been made then and there; for Plato deduced a principle of matter. But like Anaxagoras, with his postulate of mind, Plato's 'matter' remained a logical contrast principle, over against 'form' — a particular over against the general — not a concrete reality; and the philosophy of reality was to remain a rule of vibration between logical poles, rather than a synthesis of reflection.

So far as a science of psychology goes, Plato must be classed with Socrates in what we may call the period of 'experimental subjectivity.'

In Aristotle no less than in Plato, it is the outward movement of thought into reality that has the emphasis not the development of the subjective as psychic. This movement is that described in modern genetic psychology as 'ejection': the reading of the subjective into the external and the interpretation of the latter in terms of some aspect of the world of thought. This reached its clear statement in Plato's doctrine of 'ideas,' that is so far as the 'idea' itself was defined. It required a theory of the idea, however, only so far as that conception was to serve the metaphysical purpose. It did not require, nor did it receive, independent treatment, as itself object of scientific research or even as content of consciousness. The dualism, however, was only a mediating phase of the return to a deeper monism or

[1] The way which, when illustrated in the individual's development, is called the construction of a 'semblant' object — a matter of psychic experimentation with materials, akin to the child's playful and æsthetic imaginative constructions.

idealism: that of the unity of the particular and the universal. And in Aristotle, whose scientific impulse was strong, this reading of the subjective into the objective remained — in the doctrine of matter and form — a way of accounting for the organic character of the presented and objective world. It did not become a way of detaching the subjective. This is to say that Aristotle's point of view, in discussing the facts of mind, is more biological than psychic or psychological. Mind has definition as the form of the animal body; and while this implies a reciprocal definition of body — as material for the realization of form — nevertheless the emphasis is not on mind as such.[1]

Aristotle illustrates, indeed, an important fact in the history of science in general: the fact that positivism may be embodied in a scientific method before the criticism of the material is well advanced, and that the sciences of the objective order are usually well along before the corresponding sciences of the subjective order attain their emancipation. The reason of this limitation in the case of Aristotle appears when we turn again to the parallellism between the individual's and the race's growth in self-consciousness. The embodiment of the thought-content in things, by 'ejection' or, as the anthropologists say, by 'personification,' suffices for a theory of the world which is animistic and vitalized — for hylozoism, that is. But this does not go beyond Plato. The next step is to reach, with Aristotle, a naturalism of the objective order, by the correction and limitation of the animistic concept. This the individual does on his part by the return movement of his thought, whereby he re-absorbs a body of predicates into the 'inner' sphere. The psychic becomes, by this movement, the theatre of the more lawless, capricious, and unmanageable phases of appearance, and the world order remains what is left — the regular, the manageable, the lawful. The fixed, before neglected, now becomes the essence of things. It is no doubt a practical distinction at first, and only afterwards becomes the subject of that theoretical interest which develops its positivism first of all in the objective realm. So

[1] This is not to say, of course, that Aristotle did not make many valuable contributions to empirical psychology; he did. But still it is true that he did not develop a distinctly psychic method of treating consciousness.

the rise of science of the objective becomes possible. But not yet, evidently, can the psychic find corresponding treatment, as law-abiding and uniform in its movements; for if the inner sphere be constituted just by the segregation of materials insofar practically unmanageable, the theoretical treatment of them also is baffled; and a science of these contents must await the rise of a reasoned positivism of the inner life.

It is necessary to point this out, for it explains certain negative aspects of later historical movements — and why psychology as a science of content was so late a growth. In two later world-epochs, in particular, and in their respective world-thinkers, something of the same situation presents itself. I refer to the rise of modern dualistic philosophy in Descartes, and the rise of Positivism of the stricter sort, in Auguste Comte.

I. The Dualistic Transition.

The transition to Descartes was made through the Stoics and the theologians of the Christian Church. The Stoics, reacting against the practical individualism of the Cynics and Cyrenaics, reached the concept of a sort of general self-hood which guaranteed law and order and virtue. This was a practical and eclectic rather than a reasoned attempt to overcome the dualism of their immediate predecessors.[1] The church theologians reasserted an individualism, but to them the individual became spiritual.

In these precursors of Descartes there was worked out a genetic motive which is unmistakable also in the individual's development: I mean the advance or progression from a dualism of 'inner-outer' to one of 'mind-body': from what may be called a distinction of attributes to a distinction of substances. The individual proceeds, in his generalization, to carry over the physical part of his own person — separating it substantially from the psychic part — to the side of the 'outer' as such. It is only when he is able to do this, *and does it*, that the dualism of mind and body is anything like complete. The substantializing of the mental principle which has so far proceeded by certain curious stages — being variously a refined physical

[1] Cf. Caird, *loc. cit.*, Lect. XVII.

something, a breath, the limiting notion and form of matter — now finally becomes the hypostatized substance which bears the psychic qualities. The substance soul does finally become logically detached, but mainly for theoretical and doctrinal purposes;[1] for even then soul and body remain in so far attributal to each other, that either can be predicated on occasion as either cause or effect with reference to the other. This was notably true in the entire church development; and the view is still dominant in theology. This cause and effect bond is the last one that remained to be loosed.[2]

In Descartes, for the first time in the history of thought, certainly of occidental thought, is the psycho-physical problem specifically set in the form of the conception of a natural relation between mind and body, considered as two separate substantial principles. The problem becomes: what is the relation? It assumes not only the dualism of the two terms, but their actual separation. Descartes not only reaches such a dualism, but he sets up the full relational problem of mind and body. And further, he identifies the spiritual principle with 'inner experience' or 'thought.' He is in advance of the church philosophy in this important respect, that while, to the latter, it was a problem of *separating mind and body*, to Descartes it was a question of *bringing them together again*. Descartes said that interaction was impossible; and the theory of preëstablished harmony was the alternative.

Why then, it may be asked, did not a purely naturalistic psychology begin with Descartes? For much the same reason, I surmise, that it did not begin with Aristotle: because Descartes did not conceive the inner principle, the soul or thought,

[1] The earlier crass doctrine of transmigration as in the Orphics and in Empedocles did not involve a reflective dualism; for the soul was not defined as a principle. When the dualism arose, however, such views availed themselves of so much support, just as modern theology supplies a doctrine of immortality in support of the early anthropological belief in a world beyond. Put in psychological terms, we may say that such early religious and anthropological views were object of practical and, in some cases, æsthetic interest, but not of the sort of theoretical interest which leads to philosophical enquiry.

[2] It is pointed out elsewhere, PSYCHOLOGICAL REVIEW, May, 1903, that the case of mind and body is the last instance of the sort of commingling of substances and forces involved in interaction theories.

in terms of continuous and lawful change. Just in this was it contrasted with body. Extension is the sphere of geometry and physics; thought is the source of spiritual manifestations; and these two domains of fact, though parallel, are essentially heterogeneous. That this is true of Descartes is proved historically; just as the corresponding fact comes out in the comparison of Aristotle with Socrates. In each case a monistic idealism followed, not a scientific naturalism. Socrates was followed by Plato, Aristotle by a new mysticism, while Descartes led right on to Spinoza. In each case, we find an attempt to transcend the specific form of dualism of its own period.[1]

III. The Postulates of Modern Scientific Psychology.

From the preceding exposition, I may venture to draw certain inferences of a negative sort: statements of what the thought of the earlier centuries lacked; and follow that with the positive characters belonging to the nineteenth century science.

What the earlier thinkers lacked, then, was (1) a full naturalism in their point of view: a naturalism which could follow only upon a critical dualism of mind and body. Grant the dualism of inner and outer, take the further step to that of mind and body, then — and this is the needful thing for naturalism — admit the oneness of the knowledge of nature as a whole in the face of the cleft in nature which the dualism postulates. The thinkers we have been considering did not achieve this last step. They worked out their theoretical interest by establishing a philosophical solution of the dualism, or on the other hand, by an æsthetic handling of it.

(2) They did not achieve a positive way of treating all data as material of knowledge as such, material to be progressively systematized and enlarged by research. The former is the full scientific point of view; the latter is its method and instrument.

[1] It is an interesting point that in each such case, the supposed reconciliation is not logical but, in a broad sense, æsthetic: the motive in Plato is poetic, in the Post-Aristotelians it is mystic, in Spinoza it is religious — a matter it would be well to expound in its own place. It has its parallel, moreover, in the individual's mode of treating his dualisms, *i. e.*, by the construction of objects which are valid from æsthetic points of view. This is, I think, the normal genetic outcome.

What modern psychology has in addition is just the something that these early thinkers lack:

1. *Naturalism:*[1] or the view that all events or phenomena whatever are part of a natural order, and are subject to general and ascertainable rules of sequence.

2. *Positivism:*[1] or the view that a methodology — a theory and practice of method — of research is possible, for the discovery of the rules or laws which govern the sequences of the natural world.

Both of these scientific postulates hold for psychology. They have long been established in the physical or exact-quantitative sciences; they have been slow of formulation in the biological sciences; they are only beginning to have adequate recognition — notably, the second of them — in the mental and moral sciences. It is the characteristic feature of nineteenth century psychology, that it has developed the first of these postulates fully and the second partially.

IV. History of Nineteenth Century Psychology.

The nineteenth century opened at a natural pause in the evolution of theories about the mind. In the flow of the great currents, certain eddies had formed late in the eighteenth century. The dogmatic movement in Germany had passed over into the critical; and Kant had attempted a new æsthetic reconciliation of the dualism of inner and outer. The Kantian psychology or anthropology is essentially a renewed subjectivism — that is, so far as it is 'critical.' Neither scientific naturalism, nor positivism in the sense defined above, profited greatly from the work of Kant. Indeed the explicit attempt to refute Hume throws the weight of Kant as authority — to go no deeper — on the side of an essentially obscurantist attitude toward facts. Note the arguments in favor of *a priori* space and time, which very little careful observation would have materially modified. And historically Kant led the way to what Höffding calls the 'romantic movement,' from Fichte to Hegel.

Again, in France an impulse was asserting itself away from

[1] It should be noted that I speak of *scientific* not of *philosophical* naturalism and positivism.

the materialism of the sensationalists toward the naturalism of Rousseau. Rousseau's recognition of the psychic involved a truer naturalism than the view which denied the life of ideas and of all higher functions in favor of a sense-process materialistically interpreted. Neither Rousseau nor Condillac, however, combined both the two postulates.

In England a science of psychology was emerging at the opening of the nineteenth century. Locke had broached a subjective naturalism, which the French sensationalists, as I have just intimated, developed on one side only. Hobbes was a positivist in much the same sense for our purposes as Comte. But in David Hume the two requirements of a true science of psychology were consciously present. Hume treats mind as a part of nature — this is naturalism — and he also works at the problem of discovering the laws of mental change by actual observation — this is positivism. He is justified in both by his results; he is further justified by his extraordinary historical influence.

If then we are justified in saying that David Hume is one parent of the science of psychology — in the sense of the word that places this subject in line with the other natural sciences both as to its material and as to its method — then we have to look for the other parent, I think, to France. Dropping the figure, we may say that in Rousseau, France contributed an essential moment to the development of the science. Possibly this contribution should be called the Rousseau-Comte factor; as possibly also the British contribution should be called the Locke-Hume factor.

The influence of the Rousseau-Comte factor, which is to-day more undeveloped than the other, but is now becoming fertile, may be shown by an appeal again to the analogy with the individual's growth in personal self-consciousness. And as intimation of my meaning, I may refer to the Rousseau-Comte *motif* as the 'social' or 'collectivist,' and to the Locke-Hume *motif* as the 'personal' or 'individualistic.'

Taking up the genetic parallel, we may remark that the development of the positivistic postulate by Locke, Hume, and the Mills, *in an individualistic sense*, has proved inadequate,

so far as it claims to exhaust the psychic matter. In the development of the individual the rise of the thought of a separate personal self is a late outcome of reflection. The early stages of dualistic thought are in so far social that the mind-body dualism is an abstraction in both its terms. Mind is many minds; and body is many bodies. The material of self is collective and distributive, not unitary nor individual. The child thinks self as a term in a social situation.

If this be true, the science of mind must be one in which the abstraction of an isolated individual mental life should be used as an instrument of method rather than as a truth of analysis and explanation. And there should be a science of psychology in which the material is, so to speak, social rather than individual. This point has been worked out only in recent literature, but its advocates may find the source of this type of view in the French thinkers now under discussion.

Besides these two great movements, credited respectively to Great Britain and France, modern naturalistic psychology has had two important impulses. The first of these came about the middle of the century in the rise of the evolution theory, and from the side of biological science; the other from German beginnings, and from the side of physical science. I shall speak of these respectively as genetic psychology, finding its pioneers, Lamarck and Darwin, in France and England, and experimental psychology, founded by the Germans, Fechner and Lotze.

The various factors now distinguished may be taken up briefly in turn for consideration. I shall treat them under the two larger headings already set forth: *Naturalism*, comprising (1) the British movement called above the Locke-Hume factor (empirical psychology), and (2) the French-British evolution movement (genetic psychology); and *Positivism*, comprising (1) the Rousseau-Comte movement (social psychology) and (2) the German experimental movement (experimental psychology).[1]

[1] These two headings are indeed not exhaustive nor mutually exclusive. The viewpoint respecting the material cannot fail to influence the method; nor the method the selection of material. For example, the Rousseau-Comte current is a direct gain to naturalism no less than to positivism; and the opposite is true of the Locke-Hume movement.

Before proceeding, however, it may be well to give a résumé of principles — the platform upon which the entire development is projected. This platform is that of cognitive and reflective self-consciousness of such a sort as that which the individual has attained when he thinks of his inner life as a more or less consistent unity, passing through a continuous and developing experience: a self different from things, and also different from other selves; yet finding its experience and exercising its functions in closest touch with both. And furthermore this touch with things and persons is so close that, whatever his reflection about himself may lead to, he accepts the facts, (1) that the world as a whole *includes himself and others in its larger uniform processes*, and (2) that the methods of its treatment of him *through his body*, are also his methods of handling it. The individual must be, that is, *first*, a somewhat careful naturalist, and also *second*, a somewhat skilful positivist; and it is only when there is the reflection of *this sort of self-consciousness into the scientific endeavor of the race* that there comes a time ripe for a truly scientific psychology.

IV. Ninteenth Century Naturalism.

British Empirical Psychology. — The empirical movement reasserted in John Locke the subjective point of view reached in the dualism of Descartes. Furthermore, it attained in David Hume the return movement from a pure naturalism of the objective only to a corresponding naturalism of the subjective. Locke's subjectivism is seen in his doctrine of primary and secondary qualities, in which he renewed the relativity of Democritus and the Cynics, and in his polemic against innate

The scientific treatment of mental diseases is also a most important matter, which should be classed under positivism or positive method. It is not within my province — nor is the time ripe, I think — to estimate it. Its development is one of the great tasks of the twentieth century (cf. Meyer, *Psychological Bulletin*, May–June, 1904, for an exposition of present-day tendencies and theories).

As it happens, it fell to the present writer to draw up a report on psychology for the other great American exposition, that at Chicago in 1893. That report, entitled *Psychology Past and Present* (published in the Psychological Review, and now incorporated in the volume *Fragments in Philosophy and Science*) goes into greater detail respecting recent movements and literature, with special reference to conditions in the United States.

ideas. Hume's subjective naturalism appears in his entire work. Hume's theories of ideas, belief, substance, cause, all testify to his complete absorption in the thought of the psychic as a law-abiding and continuous flow of events.

The most explicit result of this point of view appeared, however, in the theory of Association of Ideas, upon which the school of British empiricists founded their psychology. James Mill, J. S. Mill, Thomas Brown, and Alexander Bain are the figures which are drawn large upon the canvas of associationism in the nineteenth century. The theory of association, considered as a formula of general explaining value, was epoch-making historically, inasmuch as it was the first general formulation made from the new point of view.

In France, something in some degree analogous appears in the writings of Condillac and his associates before the voluntaristic reaction of Maine de Biran and Jouffroy. The postulate of sensation was indeed a naturalism, as has been said above; but it was not motived in strict philosophical neutrality, nor did it issue in a general formula. At the same time it served to establish the Lockian tradition on the continent, and to furnish a shibboleth which, though destructive enough from other points of view, nevertheless helped to clear the way to a saner empiricism. It should be noted, too, that there were in Germany sporadic intimations, and more, toward a fruitful naturalism; but that these remained without great influence — notably the remarkable work of Beneke — and had to be reformulated in later times, shows that, as matter of fact the naturalistic movement did not receive any indispensable support from Germany.[1] Beneke's advanced positions, it is fair to add, are only now becoming generally known as anticipations of certain important genetic principles.

The outcome of this great British movement is an established empirical tradition. The gain is seen, on one side, in the soil tilled for the sowing of evolution seed; it appears again in the established spirit of patient research which is the life-blood

[1] Indeed, this might be put more strongly; for the era of the Enlightenment in Germany brought a reaction toward the more mystical evaluations of experience based on feeling — *e. g.*, in Tetens and Schleiermacher.

of science. In Alexander Bain we have the summing up of the results for the whole mental life; as in Herbart, in Germany, we find them illustrated in a new Intellectualism, and in Herbert Spencer, their further development on a Lamarckian platform. In Spencer, it is true, the psychological point of view served the need of a larger philosophical purpose; but he shows that the naturalistic habit of mind had become so fixed that the association psychology could be recast on evolution lines, while claiming still that violence had not been done to its essentially empirical spirit. A later author, in whom the positivistic method is well realized, but in whom the genetic spirit is not fully developed is William James; and still another who will be named below as one of the pioneers of the experimental psychology, Wilhelm Wundt, is not only not genetic in his naturalism (being neo-vitalistic), but has also a corresponding limitation upon his method, in spite of its positivistic claim (being somewhat obscurantist in his demand that psychology shall yield support to a philosophical voluntarism).

French-British Evolutionism: Genetic Psychology. — The rise of the evolution theory in biology supplied the direct motive to a genetic psychology. Lamarck himself recognized the psychological factor in one of his general principles — that in which he formulated the function of mind as effort, struggle, etc., in modifying the organism to accommodate it to the environment. The explicit application, however, of the Lamarckian theory was due to Herbert Spencer in whose work we recognize a conscious attempt to work out an evolution theory of mind, as a branch of general cosmology. It is interesting that it was in the same generation, indeed in the same decade, that those other Englishmen, Darwin and Wallace, gave both biology and psychology alike an impulse which has established a genetic science. For Lamarckism is not positivism; only in Darwinism did a thorough-going positivism of method supplement and correct the naturalism of Spencer and Lamarck. The contribution consisted in the extending to mind of the methods of positive and comparative research, and the formulation of a principle, that of natural selection, which established genetic continuity and by which research has since been directed and

controlled. It is somewhat remarkable that Lamarckism never secured the hold upon the minds of psychologists that it did upon those of biologists; and the progress to Darwinian positivism has had real reinforcement from workers in our science.

Now — at the end of the nineteenth century — the genetic principle is coming into its rights. It has done most service hitherto negatively, in its antagonism to a psychology exclusively associational, on the one hand, and to one exclusively structural, on the other hand. The earlier science was debtor, in its structural concept, to physics; it was a positivism of the atomistic or a-genetic type. The latter is debtor, in its functional concept, to biological science; it is a positivism of the developmental or genetic type. However fruitful the atomistic, structural psychology has been, it has had its word, and it is not the final word. A great era of research is upon us in the treatment of consciousness as a thing of functional evolution in the race, and of personal development in the individual. The general psychology of the future has been prepared for in the physical mode of psychologizing, just as the general biology of the present was prepared for by the anatomical science of life which preceded it.

Among those whose names should be mentioned as contributing either to the Lamarckian or to the Darwinian form of the genetic principle are Häckel and Weismann in Germany; and among those powerfully aiding its acceptance in their respective countries, are Ribot in France, Morselli in Italy, Romanes and Huxley in England, and John Fiske in America.

V. Nineteenth Century Positivism.

French Positivism; Social Psychology.—In France the progress of naturalism, in matters psychological, was much more rapid, and its victory more complete, than in England and Germany. This difference is due I think to the different attitudes taken in these countries respectively toward the theory and practise of religion. In France, the theological bias and restraint, in which a certain conception of the mental principle was involved, were done away with before and during the revolution; and a positive scientific method was resorted to, to

replace the theological — as witness Comte's actual attempt at a religion of humanity. In England, Germany, and America, on the contrary, while the growth of naturalism has gone on apace, the actual realization of scientific method has been slow and difficult. Such a step involves the giving up of vitalism and the theory of interaction of mind and body, together with other formulations in which the theological spirit has lately taken its stand.

In Auguste Comte we have a thinker whose dualism was ripe for a scientific psychology, but who nevertheless failed to achieve the point of view of law-abiding subjective change. Comte was, indeed, *assez positif* in his claim. He took up the problem of an independent science of psychic processes; but from failure to recognize the subjective as such, denied its possibility. His objective monism is seen in his view that it is through the objective or positive series of facts, biological and social, that the psychic series is to be done justice to—classified, arranged and explained.[1] It is the reverse swing of the pendulum to that of subjectivism, though from a different theoretical support. It does not solve the dualism; as the idealistic monisms of Plato and Spinoza did not. And it parallels practically the same stage of individual reflection as these systems: that which recognizes the futility of the half-mature dualisms of practice and common-sense. But in Comte the practical and the methodological were prominent, and he was urged on to justify the sort of naturalism in which these two motives issued. This he did by asserting the essential fragmentariness and capriciousness of the psychic as such; while he should have held to a larger naturalism, in which the external and the psychic each develops its own positive method.[2] Of course it is no reconciliation of two terms to deny one of them; and such a procedure has not the merit of æsthetic synthesis which we find in the great monisms. But nevertheless, the assertion of the universal claim of positive method was of the first importance: it

[1] His inconsistency is seen in his appeal to the subjectivism of Kant's relativism of knowledge, to refute metaphysics, while using the objective order to refute the subjective point of view of Condillac and the spiritualistic school.

[2] This was done by the school of English positivists who followed Comte in his attitude toward metaphysics.

carried forward one of the great naturalistic movements of history.

While the fruitfulness of the positivism of Comte accrued to science in general, not directly to psychology, yet it was only his personal convictions that hindered his coming into the psychological heritage as well. As it was, the spirit of his teaching awaited its working out in a later generation. It was to the profit of sociology; for his negative answer to the question of positive psychology was possible only because of his affirmative answer to that of social science. The positive bearing of Comtean positivism comes out therefore in two ways: first, as announcing a general method, and second, as preparing the way for a social psychology which should reconstitute part of the domain assigned to sociology — that of psychic and social experience — in a separate science.

As to this latter undertaking — the isolation of the content of social psychology — the requirement had already been met, in spirit at least, by Jean Jacques Rousseau. In Rousseau, to whom French naturalism owes its main impulse, we find two contrasted and in a sense opposing points of view, one positive and the other negative. These together tended to the segregation of a certain sort of material. These positions were, first, the positive 'return to nature,' which took the form of individualism in politics and education (in *Social Contract*, and *Émile*), and, second, the theory of the 'general will,' which opened the way for a new collectivism, whenever its implications for social psychology should be brought out.

These positions of his predecessor might have led Comte into a truer view, and have brought about the establishing of a social psychology — a science of the 'general will' — in the spirit of the motto 'back to nature.' But this, as we have seen, Comte did not realize.

Undoubtedly, however, there is a profounder reason for the immediate unfruitfulness of the work of Comte — and this is my justification for dwelling so long upon it. Pursuing the method employed above, we may still recognize the requirement that the science of mind follow the genetic stages of the individual's growth in self-consciousness. With this cue, we may say that

it was impossible that a psychology of social collectivism could be established before a theory of psychic individualism had been fully worked out. The individual is, indeed, truly a social person from the start; but this he himself does not recognize until he has lived through a period of strenuous unreflective self-assertion. Moreover, even then this consciousness of his social place is not in itself the adequate impulse to the theoretical interest to explain it. So social psychology which embodies just such an interest must perforce await the development of individual psychology and then serve to supplement it. We are able to see this now, inasmuch as we are only now realizing the transition from the latter to the former; and it is for this reason, also, that we are able to see why it was that both in France and in England the repeated claim of collectivism, both social and political, was negatived and outlawed. Hobbes must yield to Locke, Comte to Mill and Spencer; and only after these latter, could Bagehot and Stephen and Tarde arise, if indeed the renewed collectivism was to have a psychological foundation worthy of the name. And it is equally true that it is only as we work out the genetic processes whereby the reflective social self of the individual justifies its right to succeed the individualistic, that we can hope to see how society can rationally hope to reconstitute itself as more than a group of competing individuals. For having begun this work later psychology, notably in France and America, deserves praise. But it can succeed only as it maintains both the naturalistic spirit and the positivistic method of Comte.

German Positivism: Experimental Psychology. — The establishing of laboratory psychology is usually and rightly accredited to the Germans; but it is not so usually seen that this work does not involve a new point of view. On the contrary, it is the culmination of the positivistic movement sketched above. It not only admits the place of mind as a part of nature, but it suggests the employment of the methods of physical and physiological science. It arose in Fechner's attempt to discover the law of connection between psychic and bodily events. Such a law once made out, research would be guided and also controlled by its recognition.

Apart from the fact that the attempt failed, so far as Fechner's investigation was concerned, the importance of the conception cannot be questioned. A later formula — that of psychophysical parallelism — is indeed truer to the ideal of a working positivism, just from its negative and colorless character. But ignoring points of controversy, we may still say that many fruitful researches have been carried out in this field; and disabusing ourselves of too great optimism, we may still count laboratory work as a part of the heritage bequeathed to the twentieth century. No doubt we are to see fruitful formulations under the rule of which great discoveries are yet to be made. Together with the actual founder, Fechner, we should name Lotze as also a pioneer in experimental psychology, and Wundt as an effective builder upon their foundations. Other great names in this connection are those of Weber and Helmholtz.

VI. Prospects.

In conclusion, it may be deemed proper to set forth the probable lines of development of psychological enquiry in the opening century.

In the first place, it is clear that both naturalism and positivism — spirit and method — are to survive in psychology, as in science generally. And for the reading of their future development we may again appeal to the rule of individual development. Certain lines of probable advance may thus be discerned.

1. The thought of the unity of social content is a great step toward the breaking down of any associational or other 'privately conducted' science. The psychology of the future will be social to the core; and its results, we surmise, will be revolutionary in logic, sociology, ethics, æsthetics, and religion — the disciplines which are built upon psychology.

2. It follows that the position that the private psychic point of view is the only valid one is to grow more and more obsolete among workers in this field. It will no longer be possible to claim that all truth about mind must be traced in some individual's consciousness, and that the laws of the science are to be those of observable psychic continuity alone. Psychic events are intertwined with physical and biological events, and their

sequences involve objective as well as subjective terms. The two sciences which will for this reason be brought into vital relation with psychology are physiology and sociology.

The two lines of development just mentioned are guaranteed by the essentially social — and by corollary, un-private — character of our higher reflective processes.

3. The genetic point of view will be worked out in a method of research by which genetic science will take its place beside quantitative science: psychology will become largely genetic or functional. The method in the biological sciences brought in by the theory of evolution consists essentially in the tracing out of genetic sequences; a thing is defined in terms of what it does and becomes and of what it arose from. The anatomy of structure is only a restricted and largely descriptive branch of general biology. So psychic processes are to be understood as phases of a continuous function; their meaning is in what they do or become and in what they arise from. The analysis of a cross section of consciousness is either descriptive and thus barren of further results, or it is hypothetical and in so far possibly mythological. This is the essential defect and the dilemma of a 'structural' psychology.[1]

The genetic movement is guaranteed by the current demand and need that the dualisms of partial reflection embodied in the older science be overcome. Only as a law of genetic development is realized can the postulates of self-consciousness at this period or that be justified. But the justification of one such set of postulates is, in each case, the abrogation of a former set, and the prophesy of a later set. The law of the whole series as such it is the task of genetic science to establish. It is no longer possible to rest content with a science of body in one text-book and a science of mind in another text-book, each of which claims that no single text-book can be written from a point of view which explains the origin of the dualism of the two, and sets forth the goal at which the dualism is finally explained.

[1] It may be observed that even the association psychology was preferable to the modern attempts to reach a psychic atomism, and from these to construct the mental life; for the law of association deals with concrete actual units, and formulates real psychic happenings.

Apart from private speculation, it is psychology alone which can solve this problem; since it is psychology alone in which the very movement itself by which the sciences are differentiated writes itself down as a form of reflection. The origin, the motives, the object, the goal of thought itself are just the content of psychology; psychology must become, therefore, more and more the interpretation of and reinterpretation of the genetic movement of the entire thought content.

4. Involved in the two lines of progress just indicated — the social and the genetic — and also confirming our expectation regarding them, there will be a racial and comparative psychology. In racial evolution the human genetic series is objectively worked out; and in the animal world, treated by comparative psychology, the corresponding pre-human series is displayed. Here psychology will come into vital contact with ethnology, on the one hand, and with animal biology, on the other hand.

Thus described, the work of the nineteenth century in psychology has been indeed most important. It has established the science; it has set the direction of its future movement. It remains for the twentieth century to reach practical applications of its results, and to improve the methods and instruments of further discovery. The present outlook is that social psychology will be carried on in France and America, genetic psychology in England and America, experimental psychology in Germany and America.[1] And such an expression is only what may be put more explicitly in the form of the opinion that in no country is the outlook so bright for the science in all its branches as in the land of the Louisiana Purchase Exposition of which this Congress of Arts and Sciences is the most interesting and perhaps the most remarkable part.

[1] In Italy the principal currents set toward pathological and physiological psychology — tendencies which are also strong in France.

AN ANALYSIS OF ELEMENTARY PSYCHIC PROCESS.[1]

CONTRIBUTED FROM THE PSYCHOLOGICAL LABORATORY OF OHIO STATE UNIVERSITY.

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The primacy of cognition among the so-called mental faculties is a tradition of long standing in that group of studies to which the term psychology is generally, but loosely, applied. The reason for this may be found in the fact that the chief interest that has determined the development of these studies was philosophical rather than scientific, and the validity of knowledge, not the process of knowledge, came to be the vital point on which other groups and branches of these studies centered. Not to go farther back than the founder of modern empirical psychology, we find that Locke, while he introduced us anew to a face-to-face acquaintance with the facts of our own minds, was dominated as much by the certainty and extent of knowledge as he was by the contents and relations of the knowing consciousness in the *Essay Concerning Human Understanding*. The probable origin of the Essay in a series of discussions relating to the moral life suggests the complex motives of the author, and the subordination of the analytic and descriptive features of his work. This view of psychology which makes it a subdivision, or a special method, of an inter-related series of reflective studies has more than historical significance. It is variously held by writers to-day who perhaps would agree among themselves in no other single point. We have no quarrel with those who consciously work out their psychology in dependence upon some broader and more human interest, such as epistemology or

[1] The writer wishes to acknowledge the assistance of his colleague, Dr. T. H. Haines, in collecting part of the data on which this paper is based. For the use to which it is put the writer alone is responsible.

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ethics, and for these we can understand why cognition should not only bulk larger, but be primary in their psychological theories. In another way than this has tradition vindicated itself; for among those who claim for psychology its right to an independent study, and have cultivated it according to the most modern scientific methods, cognition, by some, is still accorded its historical position, and an intellectualistic cast is given to their treatment of mental process throughout. The most conspicuous example is Professor James, who claiming for sensations a distinctively cognitive function, affirms, in his definition, that they are '*first* things in the way of consciousness.'[1] This may be, or it may not. It is a question of fact which cannot be decided by an appeal to history, and one on which an opinion, pious or otherwise, has no particular bearing. The importance of the present study consists in definitely raising the question of fact, for it seeks an answer to the inquiry, What *are* the first things in the way of consciousness? It is, in other words, an attempt, experimentally, to determine what, according to the general view of the subject in relation to which we are bringing our own special problem, is the nature of the *primum cognitum*, if and so long as *cognitum* be not too narrowly interpreted, as, for example, to exclude the possibility of the *primum* being something else than cognition. To put it in another way, our question is, What is the character of our most elementary conscious experience?

The feeling out of which such a question comes, we admit, is not new. As we have said, Locke was side-tracked through other than purely scientific interests. But it is interesting to note that something very near to the present inquiry is implied

[1] It should be needless to say that we do not necessarily imply that Professor James with his abhorence of the 'Kantian machine shop,' is to be included among those who have given us an exclusively intellectualistic psychology. But if the 'first' forms of consciousness are cognitive in character and there is to be genetic development throughout, we do not see how you are going to avoid subordinating the other functions by making them dependent on this one. You may, of course, introduce them as independent factors; but psychological pluralism does not answer the scientific question involved in the demand for explanation, if it is as far as you can go in the way of description. As I have said in the text the first question even for descriptive psychology is, Are the first forms of consciousness of a cognitive order?

in the theory of Leibniz concerning the grades of knowledge to which he was led through his doctrine of monads. Remaining under the intellectualistic tradition of his predecessors, there is yet an attempt at a closer analysis of the field of cognition, so as to get at the elements of consciousness, in his postulation of *petites perceptiones* to account for those forms of consciousness which do not exist as clear and distinct ideas. The importance of the distinction thus drawn is best seen in the work of Baumgarten who took the suggestion of Leibniz and founded on it a new science. Recognizing with his contemporaries that logic is a theory of the higher forms of knowledge, Baumgarten contended that gnoseology, or the science of knowledge, was incomplete until it had provided a theory of the lower forms as well. This theory he sought to formulate in what he termed æsthetics. Æsthetics, therefore, is primarily a branch of — as we should say — epistemology, and it is distinguished from logic, which has to do with clearly perceived truth, because, while it still is an investigation of truth, it is confined to truth under particular forms — to truth confusedly, not explicitly and clearly, apprehended. Such a distinctive class of truth, Baumgarten holds, we have in all our judgments of beauty. Æsthetics, consequently, is not only a department of knowledge, but also a theory of the beautiful. This connection of interests that seem to be wholly analytical with the formulation of those questions that center in the artistic side of life is mentioned here because the writer has come, in part, to the problem of this paper through a study of simple æsthetic reactions the results of which were published, in collaboration with his colleague Dr. Haines, in the PSYCHOLOGICAL REVIEW.[1] Here it was shown that judgments of appreciation are in themselves much more elementary and immediate than those judgments of beauty which unmistakably involve a cognitive element. It would seem to follow, therefore, there are forms of conscious reaction which are more primary than cognitive reactions, and, independently of the latter, are sufficient for the guidance of conduct. These conclusions certainly put the

[1] T. H. Haines and A. E. Davies, 'The Psychology of Æsthetic Reaction to Rectangular Forms,' PSYCHOLOGICAL REVIEW, July–September, 1904.

present inquiry in a new and interesting light. In this connection, our task is simpty to work out, as far as possible, certain of the implications of the former study in an experimental way. The results of this paper, consequently, will have an important bearing upon the psychology of the æsthetic consciousness in general if it in any way makes clear what is the character of the more immediate and primary processes of mental life.[1]

The great advances that have been made during the last quarter of a century in the formulation and study of biological questions has not been without its influence upon both psychology and philosophy. As concerns psychology there has been, among the biologists, a tendency to annex the field of consciousness, and among some psychologists the grand ambition to lay hands on all vital phenomena as a legitimate field in which to exercise their psychological enterprise. These are extremes which but indicate the close relationship that many have come to feel exists between the two sciences. Among those who take a saner view of the mutual helpfulness of the work done in both these fields Principal Lloyd Morgan, who is primarily a biologist, and Professor Mark Baldwin, who is primarily a psychologist, are entitled to first recognition. Each in his own way has led us to investigating the kind of problem that is here undertaken from the experimental side. But so far as we know biological interpretations of mental phenomena have remained within the realm of theory, as for example in the articles of Professor H. H. Bawden, and have never been submitted directly to the test of facts brought to light by the laboratory method. The writer has to confess that it was the desire to scrutinize more carefully a certain view of the nature and place of attention in conscious experience to which

[1] It may be well to note here that the conclusions of an experimental study of this kind will be of assistance in deciding between the two views of æsthetics which engage the largest share of attention at the present day. These are the intellectualistic and the emotional views. But, of course, beforehand and independently of some such inquiry as the present one, we can decide, not on a basis of fact, but merely on the basis of temperament. This is a similar limitation to that placed upon ourselves in connection with the supposed primacy of cognition among the mental faculties. Here as there, no extrinsic interest must be allowed to influence our proceeding. It is, before all, a matter of fact with which we are concerned.

he had been coming, and which seemed to owe something to the influence of his studies in the field of biology, that led, in part, to the particular problem with which this paper deals. He was anxious to know whether his conclusions already tentatively reached were experimentally verifiable. If they were, the independent line of evidence thus brought forward would tend to confirm his position; if they were not, his theory would have to be held with less confidence, certainly modified, and perhaps abandoned. But this bit of personal detail is important not merely as helping to define the problem more specifically, but also as going to show that the newer phases of psychological study may be mutually supporting and corrective. They are, however, the experimental facts which are our chief concern whether they are to be given a biological or quasi-philosophical explanation. Primarily, we are concerned to know what is the character of our most elementary psychic experience.

II.

All the experiments were conducted in the dark room. The eyes were the only organs of reaction. The observer was seated in a chair before a black cardboard screen placed in a vertical position 1.3 meters away from the eye of the observer. The source of illumination was a sixteen-candle-power light enclosed in a box directly behind and above the observer's head. The light was emitted through a three-quarter-inch hole covered with tissue paper. This light was controlled by means of a switch by the experimenter who sat behind the screen. He could give a longer or shorter exposure as circumstances directed or his purpose suggested, but the aim throughout was to limit the experiments to momentary stimulations. Besides, no two successive experiments were made so close together in time that perfect accommodation to the dark had not been restored. In this way the interference of after-images was successfully avoided.

The figures to which the observer was required to react were made of white card board. They were not, with a single exception, larger than 100 mm. in the greatest dimensions. The purpose of this was to avoid overtaxing the attention by making

too great demands. Under the same conditions, the same figure twice the size would be likely to confuse and so dam up the mental process rather than elicit it in normal fashion. Perhaps more than twice the exposure limit would be needed in such a case, and this would give time for a larger number of irrelevant impressions to gain entrance to consciousness giving rise to numerous complications which it would be difficult, if not impossible, to properly allow for in the results. A series of different figures were used, so that no observer knew beforehand what he might expect at any given time. Moreover, he was not allowed to see the figures before they were displayed on the screen. The limit of his knowledge was that some form would be exhibited, and he was asked to describe as accurately as he could what consequently took place in consciousness. Meanwhile he was engaged in conversation to eliminate as far as possible the influence of a heightened expectation. Pre-adjustment in this way was reduced to its simplest condition.

At one time it was thought desirable to use auditory, as well as visual, stimuli, introducing for this purpose a number of instruments of different timbre. This would have obviated any objection from pre-adjusted consciousness to a given form of stimulus. But what would have been gained in this point would have been lost in others. It would, for example, have put the oberver under a strain in the preliminary stages of the experiment and so confused, through complicating, the problem for him. Besides, it would have put the two stimuli on a different footing by requiring reaction to the auditory stimulus under artificial conditions, for while we are accustomed to the transition from darkness to light, even in the abrupt way involved in the experiment, we do not so naturally pass from darkness to sound. For these reasons it seemed best to use only one form of stimulus, and that under nearly as usual conditions as possible.

The figures used with their dimensions, and designated by letter, are as follows: *A*, circle, 100 mm. in djameter. *B*, circle, 100 mm. in diameter, with central portion cut out, leaving a ring 25 mm. in width. *C*, equilateral triangle, 100 mm. a side. *D*, Roman cross, upright 135 mm.; cross piece 100 mm. placed 30 mm. from the top of upright; width of cross piece

and upright, 30 mm. *E*, four-pointed star, 100 mm. in a straight line from opposed angles; perpendicular from each angle to the base of its involved triangle, 35 mm. *F*, Greek cross, 100 mm. cross pieces, 25 mm. incut. *G*, Isosceles triangle, 100 mm. length of equal sides, 90 mm. base. *H*, rectangles 100 mm. in horizontal, but varying from 100 mm. down in perpendicular direction.

There were in all 22 observers selected indifferently from students of all grades of college standing, from the freshman to the senior years. The list also includes two members of the department of philosophy. Apart from the latter, some had never studied psychology and consequently had no previous knowledge of the problem on hand, some were pursuing an elementary and some an advanced course, while one was working on a special problem in the laboratory. In view of the general unanimity in the results, this diversity in the preparation for such work gives to these results an increased significance. Sixteen observers gave only one sitting of an hour, 2 gave two sittings, 1 three, 1 four and 2 gave six sittings. There are recorded for the 22 observers 228 judgments, a little more than 10 introspections on an average for each individual. We also find 25 more judgments for rectangles than for the other figures, the numbers being respectively 126 and 101. But there is a larger number judging other figures than the rectangle — 18 for the former and 12 for the latter. With 3, rectangles only were used; and with 10, the other figures only; while with 9, both kinds were employed. From this it will be seen that in working out the problem no element was neglected or unduly emphasized, and that whatever differences in the way of simplicity or difficulty presented by the figures themselves would be overcome in the process as a whole.

III.

This investigation was begun, as we have said, to throw light upon a very definite and limited problem. With its progress it was found to involve a number of other interesting though related inquiries. From the beginning the series of interests grew, and the observer was questioned on all of them with a view to bring definiteness into his own descriptions of

mental process. The points that came to be more distinctly emphasized will form convenient headings under which to group the material of the introspective notes.

1. *The Temporal Relations of the Illumination and the Perception of Form.* — Waiving for the time being all questions concerning the character and genesis of what may be called illumination-consciousness, the fact to which the testimony points is that there is a psychological time scheme within which it and the resultant perception both fall. There is, that is to say, a clear recognition of the time difference between the consciousness of the stimulus (light) and that from which the stimulus comes (form). The evidence on this point is unequivocal. There is no single case where we had to record a failure to react to the light stimulus as something distinct from the figure which by its means became discernible. Fusion of the two factors in a single experience sometimes occurs, but this is not so common as to throw doubt upon the other case, not more so than a distinct diminution of the time-interval which is also remarked upon. These we regard as variations due to the length of the time exposure, or to the interest of the observer at the moment, and perhaps in the majority of cases both act as coöperating causes to bring about the modification.

Confining ourselves to the main point, S. says: "I got the illumination before I got the figure. I could not have told what the figure was unless I had looked at it," that is exercised discriminating consciousness upon it. There "seemed to be," remarks He., "a difference in time between the light and the figure. I saw the light before I saw the figure." La. got the illumination as "a flash of light, definitely restricted in area, but no definite shape. Did'nt know what the figure was until it was gone." In this Do. agrees. He says, "I got the figure after it was gone. At the instant of the flash did not see the figure." R. "saw the light surface over more of the screen than the rectangle, and only came to the rectangle as a yellow surface gradually and later." K. says, "my feeling for the illumination came before my perception of the object." Ho. "did not see the figure quite so soon as the light. The first sensation was a sort of rectangular light; then I turned my eyes

toward and it was a cross." N.'s experience is almost uniformly described by saying the "figure grew gradually." H. "became aware of the shape or form after the illumination." Although in another experiment he remarks "what I was looking for was the figure," he saw "the illumination first, the figure second." "Quite an appreciable interval," he declares on another occasion, "between the shining of the light and knowing what it is."

We have not included in the above account the testimony of each of the 22 observers because the uniformity in their way of expressing the fact — 'I saw the illumination before I saw the figures' — would not add anything by repetition to the weight of evidence, besides being monotonous reading. I have selected the characteristic descriptions, adding only at this point that all the observers are agreed on this single issue. The experience comes to each in a way similar to that of the several selected witnesses. On the other hand I append *all* the testimony bearing upon the fusion of illumination and form. H. says: "Evenness of illumination and distinctness of contrast are elements in the reaction. Illumination instantaneous and with it came the form." D. "got the illumination so quickly that it and the figure fused in one." Ho., reacting to *B*, says it "seemed to come at once," but adds, "only I did not notice the black center at once." For My. the "figure came without any flash. I saw the figure and that is all I saw." Pa. remarks that "both the light and circle with dark spot in the middle seemed to come at once."

2. *Character of the Psychosis Generated by the Illumination.* — The distinctness in the time when the illumination and the given form are consciously reacted to implies that these are two separate experiences. To put it another way, they are conscious contents differently experienced. That they may be seen to form a more or less inter-related continuum does not effect, at the present, the fact that they stand out clearly from each other with qualitative *differentia*. The one is not experienced in the same way as the other. And if we were inclined to call them both perceptions, the notes make it evident that no more than perception of form is perception of light an instantaneous

experience. Before coming to their awareness of light most of the observers indicate, and describe in various ways, a preliminary or preparatory stage which, on the one hand, is connected with what, at the time, is going on in consciousness, and, on the other, with the meaning of the change which the stimulus initiates. The notes will make these points clear.

Pa. remarks: "When you began talking, my attention was turned to that. It came — whatever *it* was — as a startle. Something happened, something my mind was not prepared for in a way. There was a surprise; an abrupt termination of the series of ideas going on in my mind. During the period of surprise if it continued (*i. e.*, if it had not given place to something else) I could not have told what this thing was, if the question had been asked."[1] Pe. says: "When the flash came I became a blank to what you were saying. There was a change in consciousness, just as if I had been riding in a carriage and had a jolt." He further describes his state as a "sort of nothingness. The factors seem to be the same as in a dream, something you cannot get hold of either at the time or as you look back upon it. After this I see quivering light." L. testifies to an "arrest in consciousness before conscious of light." Do. speaks of being "bewildered for a moment." "Something happened," he again comments, "I do not know what." At another time he "did not know whether it was light or whether you might have said something." He also experiences "a bewilderment, and a different world." Again, it came "like a sort of command — Attention!" If the question had not been asked, R. "would not have known whether it was not altogether imagination. Not sure there was light, only something happened." For Ca. "there was a sudden stopping of the train of thought: stopped because," as he says, "I saw something different." Ko. is 'startled.' "The flash made me stop what I was thinking and saying," says My., and adds "the flash might have been anything, it was something indefinite." Ho. is "conscious of the stream of consciousness taking

[1] However we may characterize this state all the observers agree that it is not a perception. If the state continued no answer to the question what? would be forthcoming.

a new direction when the light comes. What I was saying was interrupted." Re. says "it came in impertinently, didn't want it. I felt it as I would an English word in a (spoken) German sentence." Similarly, N. calls it an 'intrusion.' For Fo. the light came in as a 'speck' which grew into a larger area for a rectangle. He was 'surprised to see the speck.' Co. has both a definite and vague 'arrest of attention,' and also testifies that 'something occurred.' D. is 'brought up suddenly.' Again, has a 'gentle shock as the first impression.' He also describes his experience as a 'distinct call to business.' W. says: "There was just enough to say there was something. My mind was preoccupied. It had to become disengaged to get to this. No recognition of color or shape in this experience. There was a disturbance of some kind. That is why I quit thinking what I was. The disturbance comes first." The same observer says the order of his experience is "there's something there; it's light; then the shape." Then to illustrate what he means he says: "If that were color there, *e. g.*, yellow or blue, I would know there was something there before I knew the color. There would be the possibility of being mistaken about the color.[1] There seems to be a lapse of time before the light reaction set in." H. feels a "breaking off of interest in conversation and 'here's the matter in hand, what is it'? There is psychic arrest and a new psychic attitude initiated with the question."

3. *Growth in the Perception of the Form.* — A distinction is to be made here to clear up the ambiguity of the word perception which sometimes is used to designate a process, and sometimes a product of consciousness. Speaking first (1) of the growth in the psychic process, three stages are to be recognized. (*a*) Sometimes no development takes place beyond the perception of the light; (*b*) sometimes a development which falls short of a perception of the objective form; (*c*) a development which terminates in a true perception, that is, one corresponding to the exposed form. The second (2) topic will con-

[1] It should be remarked that this observer has a particularly well-developed color sense. The significance of the possibility of being mistaken as regards the color, however explained, cannot be put down to defective or inert sense organs.

sider the changes which take place in the objective form itself; what the form has to do with the way in which one consciously comes to a knowledge of it. These points we shall take up in order — we shall also connect the evidence with the particular form under consideration. The form letter, or proportion of sides in the case of rectangles, is placed in brackets for the purpose of distinction. Also, all the examples are brought under review.

(1) *Growth in Perception Regarded as Psychic Process.* —

(*a*) Examples in which perception does not, at best, get beyond the recognition of light. Da. (*C*) feels he "ought to see a figure." "I did see light," he says, "but when I turned to the figure it disappeared." La. (25 × 100) had a feeling of incompleteness — had no particular attributes at first." R. (*F*) says it "simply interrupted the train of thought. Did not see it." D. (50 × 100) declares there was "no form." What shape there was was oblong. More positively in another case (30 × 100) the same observer describes the experience as "too indefinite; knew nothing of the form." H. (25 × 100) "caught the figure at the lower left-hand half. Gone before I turned my eyes." W. (*D*) asserts, "I have no idea of the shape of that. An indefinite hazy patch of circular light.

(*b*) In which perception falls short of the true objective form.

He. (*F*) saw an "irregular figure, outline not complete, nor the angles clear." For this observer all the angles of the cross were rounded and the form was very much spread out. The outline was broken in the lower right-hand quarter. The same observer has almost the same difficulty with another form (*E*), only the upper right-hand quarter is missing. All the angles are rounded, the sides elongated, and the whole lacks symmetry. Of it he says it was "irregular in outline; not a cross exactly, but a thing with points." Da. (*E*) perceived a "catenary with a portion cut off."[1] With the exception of it being complete Pe., Fl. and Co. each saw it in the same way. Pe. (*F*) saw "different diameters of light, with no regularity of direction."

[1] In the case of Da. something may be allowed to the influence of association. He had been working on calculus before coming to the laboratory. With the other observers it is undoubtedly a case of imperfect development in perceptual process.

La. (50 × 100) "didn't get clear outline of figure. Couldn't say the size of the figure, only that it was a rectangle by the square corners." Do. (*E*) "thought it was the same figure as the previous one (50 × 100)." He did not "remain here (*i. e.*, abide by his first judgment) but came to 'That's something else,' but what it was did not know until," as he says, "I reflected, and then didn't know completely. Don't know whether you would call it a cruciform. Don't know as I ever saw a figure like that." R. (*D*) saw a "rectangle with a little square above the upper end. M. (*F*) "got only the left-hand side and top. The rest was blurred. The figure was like a square which has little squares projecting on the sides of the square." Ho. (*E*) had "some doubt whether it was a four- or five-pointed star, but sure it was a star." Co. called the same figure a "five-pointed star." D. (40 × 100) peceived a "small white semi-circle obliquely up in front of the screen." Reacting to the same rectangle at another time he has "only a vague notion where the bottom should be drawn, but could not reconstruct the rest." H. (45 × 100) got the "illumination from the top. Round shape at bottom. Had to supply the rest of the figure." Of another experiment (90 × 100) he says, "my cognitive act was quite incomplete. I know there was more there to see than I saw. But it was an experience as a whole." W. (25 × 100) "did not react to it as a rectangle at all. If I did not know the series in which it was, I would not have called it a rectangle." The same observer remarks of (*D*), "the nearest to the shape I got is an old-fashioned coffin, wider across the shoulder, narrower toward the head and feet. Nothing sharp or definite about the outline. Seemed pretty bright about the centre, more so than the outer edges." Of (*F*) he says "the first thing was a disc or circular figure, but the last thing I had was a square." (*E*) was described as "something like a pointed concern," that is, only the points of the star were perceived, the entire body was missing. Fo. saw (*F*) as a Maltese cross.

(*c*) In which perception is true to the objective form.

Ma. (*E*) "didn't get the form until the light was gone and I was telling you about it, then I saw it on the screen." For Ho. it "seemed as if the light faded from the centre (*B*) in a round

fashion." Fo. "made a conscious effort to see the light" yet saw the figure to be "round." (*B*) "At first," for Fl. "seemed all light. Black spot came slowly." S. got the same figure in the same way. But W., without comment, described it as a "circle with about a half diameter cut out in the centre." He also "saw the whole figure" when given (65 × 100).

(2). *Growth in Perception Regarded as Psychic Product.*— Ma. remarks that the "light came first; after that the form (*D*), and then the discernment of all parts of the form." "Didn't get the form (*E*)," he says, "until the light was gone and I was telling you about it." Re. saw (*F*) "as a keystone to an arch. It developed into a cross as illumination made edges clearer." "The form (*A*)," for N., "grew, but very rapidly. It seemed to be a round spot and grew in all directions." "Form (*D*) came very gradually; the cross beam was focal in attention and came first." For Fl. (*F*) "seemed to grow from above down." "At first (*B*) seemed all light. The black spot came slowly." Co. (*D*) says the "shape came slowly. Left to imagine part of it. Took all the time of the exposure and more to find out what it was." In coming to the perception of (*C*) he "seemed to see a cylinder vertical with the screen one inch in diameter and six in height. This faded into a triangle." S. (*B*) "saw white ring from the first, the black center coming gradually, although there from the beginning." Also of the same form this observer says "the figure became more distinct after it was gone." Da. was first conscious of "light taking shape. I was trying to make out what the figure (*B*) was." In calling (*C*) a "small illuminated triangle," he confesses there was "quite a bit of ideal construction." Of the same form Pa. experienced a "vague indefinite period in which I was wondering what it was before I could satisfy myself that it was a triangle." L. was "conscious of some sort of effort to determine what the figure (25 × 100) was; a feeling of incompleteness — wanted to get at the meaning of this first experience." Do. needed a "moment's reflection to get the content (50 × 100)." "At first," he says of (*A*), "a kind of bigness. Longer I thought of it, it grew larger. While forming judgment of what it was, it came up to the size of a base ball. It grew about one-fifth." Ho.

remarks of (*E*), "the light was intense and overspread the black. Only when this faded did I get the correct figure. First saw triangle projecting out on all sides from the main body, but could not say whether I saw the main body at first." Ho. (100 × 100) "got a ray of light. Then went out to the figure and got it." D. (70 × 100) remarks upon "an appreciable time for perception — like when one calls and it is some time before you answer." Similarly of (30 × 100) he says, "a white thing out there — an interval — That's it, is it?" Again the same rectangle was "very slow. Very well aware there was something there before I reacted to the form." "Something nasty," he comments on (40 × 100), "what's that that gives me the nasty feeling? Then it came to mind I ought to get something." H. "didn't see the shape (75 × 100) clearly. An element of pleasure at seeing something. Would describe it, as I am thinking of it now, as (60 × 100). As I reflect, not a bad shape." So of (60 × 100) "it grows in size as I think of it." Of (50 × 100) he says, "I feel I have to supply some lacking detail in the sensation. When this is done I like the form." W. first "got the impression of the thing (25 × 100). When I had that I could not have given a name to it. After the thing was off I could trace the broken side around from the impression. I could draw the picture of it about as it is." "It took a little time to get that shape (*E*). First a blurred patch of light, then had to watch it. I seemed to see the shape grow out of the light as if the light were changing form." He "didn't see the black center at first (*B*). Got a white circular figure. Outside seemed pretty clear cut. This inner spot developed in there. After I got the center, it was very black."

4. *Movements.* — In this section certain physical and physiological changes connected with the initial stages of the experiments are to be mentioned. The limitation of these movements to the first steps of the process is a fact of the introspections. In some form or another they are met with, in one or more cases, in nearly all the observers. Their character will be made plain by the following evidence.

Ho. is "conscious of moving the eyes from the door, but was not quick enough to see anything (*C*)." Ma. experienced

a "strain in the eyes. I was expecting and the eyes seemed to pull out toward the figure (*D*). Relief came with the illumination." M. (*F*) says "I was looking toward my left. I knew something took place. There was a thrill in the trunk and less in the legs. None in the arms." Reacting to (*A*) K.'s "first impulse is to lift the arms and to make a motion with the hands. This impulse the result of the suddenness of the experience. Tendency to take a deep breath at the time." "As soon as light came," he remarks, "there was a drawing up — this was subjective — so as to concentrate to go out to the thing (*C*), and this drawing up was immediately contemporary with the effort to get the outline. The movement of drawing up seemed to begin in the trunk and arms and to go up toward the head as far as the two temples. After the light, there was a dropping back, a relaxation, that is, after I am able to name the figure." "I felt the tendency to raise only in the arms and only on the right side of the eye in which I saw the figure (*D*). There was more of a feeling of spreading out within, as though I was being expanded all over." Ca. (60 × 100) says "the first thing I did was to straighten the head up quickly. Knew it was light after I straightened up." "At the first sight there is a moving of the head and a feeling of trying to see it (60 × 100) better; that is, an accommodation of the eyes to the thing whatever it was. Came to know it through the head and eye movements. Don't know what it is when it first takes place." R. describes (*A*) it as a "startle that calls attention suddenly." "My hands were up to my eyes," says Do. "I put them down with a start to see what had happened. I just jerked them down and my eyes flew wide open." After that he saw the figure (25 × 100). In another experiment (*D*) he says, "I have a slight shock all over me like the effect of thunder when half asleep." Although D. had his eyes on the screen, he says "I had to turn my eyes before I could say it was a figure. It was the light that caused me to turn my eyes to get focussed for the figure (*D*)." He. was "not looking when the figure (*F*) appeared. Thought I moved eyes; guess I was getting ready to see what is was." In coming to the perception of (*A*) he remarks, "I was looking to where I should

expect to see you. There was a jerk of the head with the suddenness of the interruption and more than necessary for the change in the direction of the eyes." S. says "I was looking over the top of the screen. 'It' got me down to where it was, whatever it was that was there (*E*)." When (*C*) was exposed this observer was looking toward the left. "I had to jerk my eyes back. Jerked them back because of the contrast. It was involuntary." (*B*) "Came as a surprise. I opened my eyes wide and changed their direction to where the figure was. I could have given detail without eye movements but not with such definiteness." In connection with both (*F*) and (*A*) Fo. "felt a contraction, squinting, of the eyes." There was "blood rushing to the head" in (20 × 100). Fl. "felt it (*F*) through my whole body. Not a startle," he explains, "but something like lightning." It developed through questioning that this observer, as he says, "likes lightning." "That (*A*) made me flinch, seemed very bright." Co. "heard the switch and strained the eyes for the figure." Under the same conditions, in another case (*F*), he "held the breath." D. says of (40 × 100) "it made me shut my eyes. Very white." "Shut my eyes and involuntary retreat" he remarks in relation to (10 × 100). "Then opened eyes, what is it!" Again (40 × 100) "seemed as a dull, heavy, non-painful electric shock in the eyes. Over in a moment. This shock meant I had an experience *not* objective." "Hindrance in the eyes. It was removed. This changed the center from the eyes to the object (30 × 100)." "Was moving," he says in connection with (40 × 100), "and the experience interrupted the sensation due to change of position. Change struck me in the pit of the stomach." "The whiteness of the preliminary illumination" of (40 × 100) "was dragged down and out toward me." H. feels (45 × 100) "pleasant about the eyes, nostrils, and front part of the brain." The first thing W. felt of (40 × 100) "was a quiver, a shock through me like an electric shock. I felt it but could not tell exactly where it was. Felt it more in the arms and legs than in the trunk. It was on the basis of that that I turned to the light." At first (60 × 100) appeared as a "streak. I turned my eyes," W. observes, "and it seemed as if I was following this band

of light and followed it up. When I struck the figure I stopped because there was something different from the band of light." "Turned my head to it (*A*) before it was gone. Didn't realize any change in turning the head."

5. *Supplementary Items.*—The foregoing detail bears more directly on the problem of this paper, yet it does not exhaust the possibilities of the experiment. Incidentally, either through direct questioning or because certain related features assume greater prominence in some instances, other points of interest have been emphasized, sometimes in one or two cases, sometimes in more, and these are grouped together in this section.

(1) Interest.—D. when questioned whether he liked the given form (30 × 100), replied, "my interest is a scientific interest in the fact." Sometimes an observer gets interested in the conversation or some condition under which it is being carried on so that the experiment is lost sight of. Thus Do. when given (25 × 100), says, "I could picture you talking to me about radium. This something appeared before my eyes and I lost the image of you. The flash seemed to come between my eyes and the image of you. For a second or two there was a blank." Another observer may keep an open path to the purpose in hand while still actively engaged in the conversation. When (*A*) was exposed He. remarked "this other (the illumination, etc.), came in because I knew what we were doing." Interest, again, may be lively in connection with the figure itself. Hence S. can say "this knocked everything else out of consciousness for the time being because I wanted to see it."

(2) Suggestion.—Under this head are grouped the few cases in which some part of the experience suggests a likeness to some other, more or less familiar, object. It is interesting to note that they are connected with the illumination, not with the more concrete, so to say, parts of the experiments. Thus (50 × 100) for D. is suggestive of "summer lightning, warm, reddish pink." (30 × 100), on the other hand, is "cold, blue lightning." (40 × 100) is "like an unusually long flash of lightning; anything may come of it." (40 × 100) is "like a large bony horse." For H. (100 × 100) "opened up as a big white sheet." W. experiences (40 × 100) as "something like

the edge of the sun coming through a cloud — a dull haze," while (75 × 100) has the effect of "distant sheet lightning — seems to spread." Fl. says that (*C*) is, as to hedonic quality, "like awaking in the morning and finding it pleasant weather."

(3) Association. — Unlike the previous group, this one includes the few cases where an apperceptive element is, or seems to be, a distinct factor in determining the judgment. They are influential in determining the perception of form. We have above noted that Da. perceived (*A*) as a catenary, perhaps through associative process. H. feels that he has to "supply some lacking detail in the sensation (50 × 100)" and adds "a distinct apperceptive element." D. confesses that in his perception of (30 × 100) there is a "distinct association of visiting card."

(4) Æsthetics. — Here we place all judgments of preference. They are attached indifferently to the illumination and perception of form. "As soon as I saw the shape (75 × 100)," W. says, "I knew it was pleasing." Co. is "indifferent to the form (*F*). Light was all right, it broke the monotony."[1] Fl. calls (*C*) "very pleasant. The pleasure came the same time as the flash and grew as I saw the form. H. calls (100 × 100) "very nice. It was the whiteness that was pleasing, decided and gratifying." Of (50 × 100) he says, "decidedly illumination is not a pleasant thing." In another instance he "liked the whiteness against the black. Don't know whether like the form (25 × 100)." "The whiteness" of (10 × 100) "very pleasant. Shape not repulsive. Cannot say I like the shape independent of its brightness." (45 × 100) is "very gratifying; visual pleasantness." D. likes (70 × 100) "fairly well. But it is not æsthetic. Like it simply because I can reconstruct it, and so study it at leisure." On the other hand he "cannot reconstruct" (50 × 100), but "likes brightness and form." He doesn't like (40 × 100), it is "too long and too high. Can reconstruct it, but not easily." "To say I liked it (30 × 100) would have to reconstruct it," that is because no algedonic quality developed with the experience. The same form, on

[1] This subject acknowledged to being "uncomfortable in the dark." He "feels a strain to see in the dark."

another occasion, occasioned a "pleasant illumination. Rather a pleasant way of reacting to it. Pleasure fits in with the mood" which he had described as "irresponsible, like a summer afternoon. The figure," he adds, "is not an impediment to the feeling and so indifferent." There was a "surprise in finding this kind of figure (40 × 100) pleasing." Of the same form, again, he was "gratified in getting it out there." He also says of the same rectangle: "Don't like it. Like a great big girl with the frame of a plow boy. Too insistent on self. Nothing modest about it. Relief when it went. Too red."

IV.

We do not attempt, in this paper, to go into the theoretical consideration of the series of problems that the above evidence suggests. There are two reasons for this. In the first place, much of what has come to light, especially with reference to the later, more concrete aspects of the question, only tends to confirm positions that are recognized by contemporary psychologists of various schools. And, in the second place, the more debatable factors, which in general belong to the earlier phases of the experience, could not, in the writer's view, be satisfactorily discussed without going beyond the limitations of the problem as it has been brought forward in this paper. What has been reserved for this section is a more definite enumeration and positive statement of what the positions are to which the testimony points. We shall perform this task with as little dogmatism as possible and without an undue amount of the spirit of controversy. For our interests are primarily descriptive. What theoretical reconstruction is involved in the statement of facts the reader may perform on his own behalf.

1. We are thrown back, in the first place, upon a consideration of *the ground on which the distinction between the illumination-consciousness and form-perception rests.* We have said that these experiences fall within a single time scheme for the several observers. The testimony is that they have now the one and then the other. How are such statements to be interpreted? Have we, for example, a *post factum* analysis, or a contemporary description? So to phrase it raises an inquiry

into the method of the individual observers. Beyond the present problem, the way in which the question is answered will have an important bearing upon the historic controversy between Comte and his opponents with regard to the possibility of introspection as the peculiar instrument of psychological analysis. For our own question we need no more than remark that if the former of the two alternatives be adopted, that this description is due to a *post factum* analysis, a memory image or series of images is substituted for contemporary experience, and that the time order which is the subject of remark relates to it, and not, primarily, to any antecedent occurrence of a psychical order. Beyond the obvious fact that memory images, like the original experiences, are, at the time when consciousness functions in that particular way, *present* data, and therefore not amenable to retrospective analysis, we may point out that by such an admission we are not necessarily bound to regard the evidence in hand as involving the substitution of logical analysis for psychological description. For in the first place the objection unwarrantably transmutes one feature of the conscious content, its retrospective character, into a distinct method, and thereby destroys the content and provides nothing for the method to work upon; and in the second place, confuses the functions of the logical understanding with those of sense. For the psychological question is whether we can get at present experience, whatever its character, in such a way that the temporal relations of that experience are not destroyed. Is our description true; that is, does it correspond to the nature, and the temporal and spatial relations of what is described? And upon this point the testimony of the observers is clear. They do not begin, as we shall note below, with a total to be analyzed, their experience is scrappy. "I could not have told what the figure was unless I had exercised discriminating consciousness, although there was a definite illumination consciousness" is a statement in which all would concur. It is, moreover, a piecemeal experience. As one observer put it, "my *feeling* for the illumination came before my *perception* of the object." But beyond the particular evidence, the experimenter's notes make it clear that, for the observers themselves, it is no ordinary or

usual experience they are describing. They are obviously in *a new relation* to the data of sense. There is, for instance, some hesitancy in giving expression to the first few experiences. And when asked, "why, what's the matter?" to use one form of answer, the reply comes, "oh, it's so funny." And when the novelty has worn off, use does not overcome the strangeness; or, as one observer who had given more than the average amount of time, put it in protest, "I don't see why I don't get the figure when I do the light." I also asked most of the subjects whether they had anticipated what the experience would be, and the unvarying answer was No. The unanimous confession was one of surprise. Such facts as these point unmistakably to something unusual in the way in which the experience develops, and are in support of the contention that introspection, if it is valid, inverts the customary order of procedure, or in other words, lays hold on the original temporal successions of conscious process.

The distinctive psychological character of the evidence is also seen in another closely related question. It may be expressed in an exclamation of the observer already quoted who could not understand why his experience did not correspond with what he knew to be the objective standing of the facts. In the experiments, light is regarded by the subjects as reflection from a given prescribed surface. The reflecting surface is the condition of the generation of the light experience. Why then is the defined surface subordinated in the resultant consciousness to the light which is, as they all think of it, illuminated form? How can the one exist independently of the other? They are surely coincident facts objectively; why do they not come together subjectively? Later we shall have to speak about the character of the elementary consciousness which the illumination initiates; we are concerned here with the fact that there is a distinctively objective phase of the experience in which the light is a real object existing independently of the perceived form. This we are assured of by the evidence of not a few of the observers who, for some reason, were arrested by the mechanism of the experiment, and got a perception of the direction from which the light came. Thus one observer explains, "I never thought of the

light being made over and back of my head; it always seemed out there. It seemed like light shining through paper." Now if this is the normal way of getting the experience, it is difficult to see why the facts as they are described do not have their full psychological value. We cannot square them as readily or at all with a logical interpretation. For in the first place, logical analysis does not normally beget psychological surprise. Surprise is a realized, though not anticipated, contradiction between expectation and experience. Logic has to do with squaring experience with fact. Here facts are discordant with experience which refuses to be squared. And it is just this condition of things that is involved in the psychological order of experience. But, further, the particular analysis to which the evidence points does not warrant us in calling it logical. Logical analysis is performed upon a total complex, and the parts or elements to which it leads are aspects or qualities. We have already said that the observers often fail to get the figure — the substantive fact, but usually come to a consciousness of the light — the adjectival part of the experience logically regarded. Here, then, we have the anomaly — for this point of view — of the parts anteceding the whole; the qualities apprehended without being qualifications of any particular subject. If we were dealing in this evidence with experience of a logical kind we should certainly expect the order reversed; the illumination would not tear itself away from its context so completely as to become a separate fact which may or may not involve any other fact or facts at the same time. But to him who understands the psychology of predication, this independence is not at all surprising; it is the normal method of growth in the case. What is logically last is psychologically first.

Incidentally, we may stop to remark that the two main points already touched upon, that we have a definite time order and a distinct experience of different contents, are not two, but closely related aspects of the given set of facts. When an observer says, "I saw the light before the figure," he not merely calls attention to the succession in the order of experience, but also to the objects which stand to one another in a before-and-after relation. There is opened, that is to say, a way to the

study of the psychology of time, at least so far as time consciousness depends upon and grows out of a real difference in the character of experience-contents. What we mean is that the temporal form in which the descriptions are unanimously thrown would be an enigma if the observers were engaged in ascertaining the relations of differentiated aspects of a single complex. Such analysis, whatever else it might produce, could not give rise to antecedence and succession. Antecedence and succession rest upon an actual difference in the contents of experience. This harmonizes well, as we have seen, with the evidence. Perception of light and of form have a definite time relation because in experience they do not fuse into a single whole, but stand out separate and distinct. We conclude, therefore, that the grounds on which our descriptions rest are not logical, but positively and unequivocally psychological.

2. *Problems Connected with the Psychology of Perception.* — Two facts stand out quite clearly in our study in its bearing upon perception. The first is that perception is a mental process, not an act; and the second that the perceptual content undergoes a growth before it can be accurately defined. These facts, which may be taken as the commonplaces of current psychology, are the starting points of further questions which are still open to further investigation. These questions, all of them, relate to what takes place immediately before, and during the time the mind is coming to, its final position. But before suggesting anything along this line it may be well to point out that while there is a stage in the perceptual process which, from its elementary character, precludes its immediately issuing in a judgment, and which, if it be arrested, nothing could be said concerning the nature of the object which the whole process is intended to determine; yet so far as the process, as process, is concerned it is no different from that which goes on in the further development which is engaged particularly in defining more accurately the relations of the parts within the total complex which is the terminal point of the entire process. If we wish to designate by a distinct terminology what we have above called perceptual process and perceptual product, we may describe the former as

a mental intent and the latter as a mental content. This brings the whole series of changes under a single point of view, and enables us to say that, psychologically, an intent and a content of consciousness are different phases of a continuous growth in mental life. That the material to be organized into higher products is or may be different in these two stages we do not deny. What we are interested in at the present is to suggest that we do not find any reason for interpreting the process of an intent in a different way from the process of a content. The two are distinctly processes of the organization of psychic material into higher conscious products. Now this view of the psychology of perception enables us to raise one or more pertinent inquiries concerning the process which is, as we have said, one throughout. What takes place in the more specialized stage is what takes place in the more generalized stage. The theory of perception must be applicable to the latter as well as to the former.

The whole import of the inquiry thus raised cannot be discussed here. Even all that bears upon it in the present investigation will not be included at this point. We shall only speak of the more obvious or available features of the problem, those that connect with the historic theories of perception. And we shall start from the stage of intention. Some of the observers, it will have been noticed, refer definitely to this. Such remarks as "I felt I ought to see a figure," "I knew what we were doing," "I wanted to see it," "a distinct apperceptive element," etc., unmistakably indicate the influence of intention as a guiding motive in the elementary stages of perception. Furthermore, there can be no doubt that this element, certainly present, as I hold, in all perception, is unduly heightened from the limitations of the investigation. It will be remembered that the observers were told that some form would be displayed on the screen. This would tend, not to introduce any new factor into the normal mental process, but to give a special direction to one of the factors and thereby emphasize its function. In the cases I have cited, and in all others of a similar kind, this over-emphasis has tended to make the intention conscious, at least to the extent of defining beforehand a general class to which the particular form

belongs. This is seen in the remark of one observer with whom, up to that time, I had been experimenting with rectangles. He said: "If I didn't know the series in which it (25 × 100) was, I would not have called it a rectangle." Also, another remarked: "If I had not been expecting light, I would not have known what it was." But if in these instances the process has become pretty explicit, and in some of their features involve a more complex development than is usually found at this stage, it would not be true to the bulk of the evidence to suppose that intention is devoid of all objective characteristics. Being, as we have said, a stage in the process of perception, intention makes a positive, though not definite, reference to a content which is not identical with itself. The suggestion, therefore, which is unavoidable in the experiment, that some form will be shown, does not impart objectivity into a process which is devoid of it, and the knowledge, general or particular, of the series only hastens the course which runs in normal fashion to the terminal judgment.

The question whether association is involved in our elementary cognitive processes is definitely raised in these experiments. To state the same inquiry another way, we are interested to know what determines, at this stage, the character of our conscious contents. In the examples just quoted, it was, no doubt, preadjustment for rectangles and for light which influenced the final perception. And due allowance in all cases must be made for the influence of the form-concept or light-concept which is controlling throughout the series. Nevertheless the surprising fact is that so few positive examples of association were found. The indications are that a clear interpretative clue to the experience is, in the majority of observers, altogether lacking. And this is true in reference to both the more elementary and developed stage of the process. If, therefore, by association is meant the subsumption of a particular perception under a general idea or class, we do not find that such a procedure is characteristic of elementary psychic process. What we do find is the foundations for such a rational development. We should, consequently, say that association is the outcome of perception and is made possible by it. Stated contrariwise the

way is opened to all the inconsequences of the associationist, besides being contrary to the facts of psychological analysis. But it is not to be presumed that there are no controlling influences or directive suggestions, or that perceptual development cannot be shown to be subject to law. The continuity of the whole process from start to finish, forbids such an interpretation. One observer, for example, calls the first disturbance occasioned by the light and the final perception of the light "two stages in a single process. I do not," he says, "experience them as separated from one another." The problem is how he passes from the first stage which is "a mere impression" of which he can affirm that "'out there' is not the first thing," to the definiteness of experience which enables him to describe it as an "objective process." Whether he can justify the assertion fully or not, we are warranted in affirming that the evidence goes to prove that these conscious processes develop their own suggestions which act as clues to the meaning of experience. In support of this position we may refer to the preponderating number of cases where perception failed to correspond with the actual form exposed, and to the uncertanty that characterizes the detail of the perceptions which were correctly named. For in the latter case we must remember that the name attaches to the schema or general appearance and not to the object as a synthesized complex. That is to say, to correctly name and to correctly perceive an object are not necessarily one and the same thing. For a satisfactory understanding of the perceptual process, therefore, we need a new word to emphasize its non-rational character, and the best for this purpose seems to be the term suggestion. The psychology of suggestion has been developed in connection with so-called abnormal states of mind; but we surely need to bring the results there obtained in line with those obtained by a closer analysis of elementary psychoses. What the mechanism of suggestion may be lies outside the limits of our inquiry, but the character of suggestion is clear. It is a clue developed in normal mental process which becomes controlling in the further development of that process. Its special field of operation is sub-rational consciousness. Further work along this line may profitably be

undertaken, andbelow we shall have something further to say concerning it.[1]

3. *Questions Relating to Undifferentiated Conscious Experience.* — In the immediately preceding topics have been discussed the more concrete phases of elementary psychic process. The more difficult task remains. What can be said concerning the character and method of our most primitive consciousness while still inchoate, and before the first differentiations into definite products appear?

Our resort must, in the first place, be to the evidence already reported. The general fact that there is a period definitely marked off at the beginning of a new conscious process has been established. In attempting to ascertain the character of such a beginning, such a *primum*, the ways in which the observers describe the experience is, before everything, important. The variety of terms used is surprising; but not more so than the fact that they so unanimously indicate a mental, rather than a physiological, condition. Some of the descriptive phrases are in this regard open to question; but, on the most liberal interpretation, not more than a third of the entire list could be claimed to indicate a physiological experience, and all of these might better be considered from a distinctively psychophysiological point of view. Those I have in mind are the following: 'Startle,' 'jolt,' 'brought up suddenly,' 'gentle shock,' 'disturbance,' 'attracted,' 'mere impression,' 'pulsation.' On the other hand, I should claim the following as most fittingly describing a mental experience: 'Surprise,' 'blank,' 'nothingness,' 'psychic arrest,' 'bewildered,' 'something happened,' 'consciousness taking a new direction,' 'different world,' 'interrupted,' 'impertinent interruption,' 'intrusion,' 'direct call to business,' 'the matter in hand,' 'there's something,' 'a command — attention!' 'something else,' 'breaking of interest in the conversation,' 'feeling of oppression.'

It is evident at the outset that not all of these phrases indicate an equally primitive state of mind. Some of them are quite explicit in their reference to what is at the time taking place in

[1] Cf. 'Psychology of Æsthetic Reactions, etc.,' PSYCHOLOGICAL REVIEW, XI., p. 267.

consciousness. In others, while such a reference is undoubtedly present, it is there implicitly. Still a third class is characterized by the absence of any reference at all. Before we go on to study the facts it is important to inquire whether these various classes can be brought under a single point of view. The first two obviously belong together. Are we to consider the third class *sui generis?* It might, of course, be argued that the most unspecialized form of consciousness differs from the more highly specialized in degree only, that, consequently, the second and third groups really belong together, and that all three may be classed together on the principle that they are forms of experience which are determined by the relation that the more recent content sustains to the less recent. This would be, doubtless, a very desirable conclusion to arrive at, and some such position might be indicated if we were able to develop more fully the intentional characteristics of these experiences. But we cannot solve the difficulty, at this stage, by forcing upon the fact's consideration of a theoretical nature which, if true at all, are valid only from the observer's standpoint. What we have to take into account is that for the subjects of these experiments a small, though significant number of experiences do not contain, even implicitly, a reference such as the others unmistakably do. The clue to their classification must be found in the way they are experienced. This is a suggestion which, as old as Hume, was made by one of the subjects at the beginning of the experiments. The second figure to which he reacted 'didn't strike like the other,' which was his first reaction, and the difference consisted in the fact that he 'knew more of what was coming.' This mental contest modifies, though it does not alter the character of the new experience, and it is only in the rare case where this falls into the background so as to be practically inoperative that we get the experience in its primitive form. The relation to other mental content, therefore, of any new conscious experience while important from a developmental point of view, can give us no insight into the character of any elementary and undifferentiated psychosis. If the groups which have been distinguished under this section properly belong here, it is because they 'strike upon the mind' in a similar way, their genesis is

alike. They are forms of conscious experience which are determined by what is not now present to consciousness; they are 'given.' Without exception this is the testimony of the observers. And even in that class where the reference is most explicit to present conscious process, that reference is always to its interruption. The new experience comes; it is never developed out of what is transpiring. If it did, it would not be new. The three classes, therefore, share the same fundamental characteristic of elementary process: they do not develop out of previous processes, but are initiated from without.

If this conclusion is correct we have in it a reason why the physiological factors are not more emphatic or more important. The truth is that we have in them only one set of conditions under which the experience may develop. The distinction between the two main groups into which the cases fall consequently are only of relative importance, now one and now another aspect becoming prominent. Thus one observer can describe the same experience in both physiological and psychological terms. When he says his mind becomes a 'blank,' he refers you to a 'jolt received in a carriage ride.' But immediately in trying to make his meaning clearer he uses the term 'nothingness' as a substitute for 'blank,' and adds "the factors here seem to be the same as in a dream, something you cannot get hold of either at the time or as you look back upon it" — surely a psychological description. In the same way we find that when an observer is impressed with the psychological features of the experience, as for example when the stream of consciousness is interrupted or attention is arrested, there is an immediate reference to something else as happening to account for the change. In either class, therefore, both factors are present, and both classes are alike in their genesis — they are of the nature of an 'intrusion.'

If we wish to gain an insight into the character of the experience, rather than a knowledge of the conditions under which it may arise, we do not find special help in the physiological group over that we may receive from the more distinctly psychological group. It would seem that in every case, as one observer put it, "the process of illumination is a critical thing."

This refers, as we find out from other observers, to the intensity and duration of the stimulus. "A large illumination," says one, "is a challenge to examine the *figure* and cuts out all the first part." That is to say the early developmental processes depend more directly upon objective form than would be possible if the stimulus were of shorter duration, and therefore they come to maturity sooner. This agrees with the testimony of another who is of opinion that "a person gets the experience better if he is not looking quite at the thing and allows it to attract him. Then there seems more to it, and more stages of it." It should be noted that "not to look quite at the thing" has the same effect as shortening the duration of the stimulus. Its influence is similar, namely, to throw one back, so to speak, on the earlier stages of the process and to emphasize these. The problem for the experimenter, therefore, is to find out the appropriate length of exposure for a given observer so as to elicit in the development of the experience just those features which, under ordinary conditions of perception where the stimulus is uninterrupted, would be likely to be hurried over or not consciously felt. The stimulus, however, may be so shortened or may be given under such peculiar conditions that we fail to get anything to our purpose. As an example of the former, one observer "would not have known whether it was not altogether imagination" if a question had not been asked about the experience. Another observer was engaged for the first time in the experiment during a heavy rain storm. The illumination was felt as a flash. "The flash," so the notes read, "made me jump. I didn't know what it was at first, but thonght that it was lightning." Here, of course, we have an example in which the character of the given experience fits in with the general conditions of the moment, and it is difficult to say whether the one or the other, in this case, is primarily suggestive. The complication, however, would warrant us in regarding it as too highly specialized to make it serviceable at this point of the inquiry. But it serves to illustrate the remark that the way the stimulus is given is a crucial factor in the particular manner in which one gets the experience. The experience is the same wherever there is contrast between darkness and light; but the elements are more easily discernible under some conditions than others.

But besides duration, intensity also plays its part in the resulting experience. The number of cases under the section entitled Æsthetics would be considerably lessened if those that depend upon color-contrast were eliminated. Color-contrast, of course, depends, in part, upon the intensity of the illumination. But they would be considerably increased were it not for the number of color illusions that interfered with the development of æsthetic feeling. The factors are too evasive to determine what is exactly controlling in the visual impressions. One observer reacted so unevenly in this regard that the remark was passed upon the fluctuation of the light. In a general way the conclusion is warranted that intensity is directly concerned in developing the coincident processes, and only indirectly with initiating perceptual processes. With this the evidence of an observer seems to agree. He said: "I think a little brighter light would have helped me to like the figure, but the form would not have been my choice at all." The progress of the experience would have been smoother, that is to say, there would have been less hindrance, and the facility would have been pleasing, although the particular figure, under other conditions, would not be æsthetically satisfactory. Hence he remarks: "I should like any figure better for brightening it up, because it would sharpen the edges. Yet this would not change my choice of figures. For example: My choice of figure, even if it were dull in illumination, would be preferred to the figure which, not being my choice, were well illuminated." In other words, intensity in illumination becomes primary in importance in æsthetic judgments, but is secondary in arriving at judgments of perception. This accords with what we saw above, that the longer the duration of the stimulus the shorter the initial stages. This is merely the converse statement of the fact that the lower the intensity, above an ascertainable minimum, the longer these same stages. Duration and intensity work conjointly in inverse ratio to determine the initiation and progress of our elementary psychic processes.

All the cases we have cited imply the fact of change. From this point of view the descriptive phrases may be regarded as attempts to define the supervening conscious process. The

purest forms of the experience are either simply psycho-physiological or æsthetic. Both are alike in having the cognitive factors practically inoperative. Thus, to say that one received a "mere impression" without being able further to characterize the experience, amounts to little more than signifying the fact of change itself. Contrast here is not sufficiently developed to place the new fact upon a background of difference. So far as we can judge from the few cases that are noted, the observer is, in such instances, in a condition of physiological receptiveness, and the new experience is not sufficiently striking to make it stand out from the rest of his sense-feelings. This harmony of the new with the old is also characteristic of those cases of the æsthetic group which lay emphasis upon the mode of reacting. This is brought out distinctly by the observer, who remarked upon the "pleasant way of reacting" to the illumination. The "pleasure fits in with the mood." The absence of demands in these simple æsthetic reactions is emphasized by the further description that the entire experience is "irresponsible, like a summer afternoon." The figure is quite indifferent because, as is remarked, it is "not an impediment to the feeling." In both these cases, the cognitive element, which would emerge in an effort at defining what it is that fits in with the general condition of the moment, is inefficient; the stress is laid upon the process itself. To correlate this with what was said above, we may state that here intention takes precedence of content; a present process is furthered, at least to the extent of lengthening it, by bringing in more suitable material for organization. Such a process, we may remark, grows by what it feeds on; and the lengthening, to which reference was made, means that there is also a growing complexity of structure which ultimately issues, as all intention does when it has progressed far enough, in the definition of a content. There is, that is to say, in all the most elementary phases of consciousness, to adopt the words of Mr. Stout, "an inherent tendency to pass beyond themselves and become something different."

Another, and larger class of cases, shows a more abrupt way of beginning the experience. There is implied a definite mental content which, for reasons special to the individual at the

moment, is practically annulled. An abrupt termination of one process is coincident with an equally abrupt initiation of another. In these cases, contrast is at its maximum. This is true of the following: 'interruption,' 'startled,' 'start,' 'blank,' 'surprise,' 'arrest,' 'consciousness taking a new direction,' 'brought up suddenly.' The explanation of one observer is true of all that the phrases indicate an 'abrupt termination of the series of ideas going on in the mind.' The 'series of ideas' differs with different individuals, sometimes they are ideal contents, sometimes mere sensuous impressions, but the result is the same that as further development in line of them takes place, something different becomes substituted for them. The reasons for the change from one to the other also vary. One 'does not feel comfortable in the dark' and is glad to be relieved; he is ready to react to anything that offers a relief from the tension that controls his feelings. Another is taking part in the conversation in a listless fashion because he 'knows what we are doing,' and holds himself in readiness to attend to it whenever the opportunity is presented. A third becomes absorbed in the preliminaries, and the illumination fairly knocks his present state all to pieces by its very incongruity. One readily develops new interests, and lets anything that is present and familiar go to 'get at the meaning' of the new and undefined. Another is attracted by the different simply because it is different without interest in the character of the thing, or as one observer put it 'because that sort of thing happened' although there was no knowledge of what 'that' was. Sometimes it is a matter of attention growing tired, either when the conversation has been too long or upon an uninteresting topic, and the change is made for 'relief.' Again the introduction of the stimulus may, as it were, develop an entirely new state, as, for example, a 'nasty feeling.' This does not seem to be so rare as the single case in these experiments would indicate. A colleague, Professor F. C. Eno,[1] reports that, under conditions sufficiently exact, he experienced a 'feeling of sickness' in the region of the abdomen under the influence of a sudden auditory stimulus.

These variations, which are not exhaustive, are typical, and

[1] Associate professor of civil engineering, O. S. U.

serve to show the conditions under which a sudden change may be introduced. But they do not aid us to an acquaintance with the experience itself. For this we must look elsewhere. The fact that none of these examples are abortive is significant. They all amount to *something*. They do not, as we have remarked, all lead to a correct perception of the form, and some stop short with the perception of light. But that they develop into some sort of a definable experience indicates that some sort of material capable of growth into cognitive results has become operative. Two questions are pertinent at this point, namely, what kind of material, and how is it received? Upon the basis of these experiments, we cannot give a satisfactory answer to either question. But I may say that the indications are for a modification of the current view which is still too largely under historic influences. Receptivity of impressions, in the sense that some stuff is imported into consciousness to be worked up through various processes into definite products, is only an approximation to the facts. Primitive psychic material does not seem to be so much received from without as developed from within. And this development seems to take place in dependence upon our practical attitudes. It is, in other words, a question *where* the primary reactions are to be placed. The ordinary view makes them take place in response to, and as the result of the arousement of conscious experience. The suggestion we make is that, in what I have called our practical attitude, the reaction is involved in which conscious experience first begins. This is borne out by the variety of reasons that operate in the cases under consideration, reasons that are practical in the broad sense for the observers themselves. It also accounts for the discontinuity that is a feature of these cases, that is to say, for the apparently untraceable beginning of these experiences. These originate, we should say, in the practical solution that is found for the unsolved problem before each observer. There is, on this supposition which cannot be worked out here, no absolute break in conscious process, although in experience there may be the consciousness of difference. Difference there surely is, but it is difference within a conscious *continuum*.

The last class of cases presents a conflict of contents. We may distinguish in the examples a difference due to the emphasis the individual, unintentionally, places upon the conflicting elements. It is to be expected that the observers generally would hold themselves ready to attend to the business to which they were giving themselves, and that thus they would easily drop one end of the conflict in preference for the other. This is the case, for example, when the stimulus comes as 'a sort of command — Attention!' It operates in the first place as a means of calling the mind off from the present occupation to something else which the condition under which it comes make relatively more important. This is true also of the others who refer to the illumination as an 'intrusion,' 'breaking of interest,' 'disturbance.' There is, that is to say, not merely a break in conscious process, but a break which involves a wrench under the operation of a sub-conscious adjustment to just this stimulus. Thus one affirmed his 'mind had to become disengaged' from the present conversation in order to get at the new experience. There is more or less of a struggle on the part of the observer to secure to the intervening factor its rights of precedence. Sometimes the effort is less conspicuous, as when one, in a matter-of-fact way, says 'Here's the matter in hand.' The degree of effort depends, it will be seen, upon how easily revivable is the original suggestion of a light stimulus. In all these cases revivability is sufficiently difficult to introduce a conflict between the incoming and the outgoing processes. Another set of instances indicate that preference is given to the other factor, to the present rather than to the new experience. Hence the illumination, for one, 'came in impertinently.' He 'didn't want it.' The examples which refer to the 'bewilderment' occasioned must be classed here, because there is a 'conflict of contents' with no positive preference for the initiated change. In order to understand these cases, it is important to remark that there is no reason in the character of the new stimulus itself to account for the break between one process and another, or for the precedence that the one takes over the other. This rather is the truth of the matter in the immediately foregoing class when the discontinuity between the two experiences is sud-

den and abrupt. If a new process can develop at the start a sufficient amount of interest, it will more effectively put an end to other conflicting conscious processes, although these may not be devoid of interest, than if it depends upon developing an interest during its course. We have seen a variety of conditions on which interest is conditional in the class where there is an immediate arrest. The stimulus itself becomes interesting in those cases. Is it true that in the present class, in which conflict is prominent, that interest is wanting? On the contrary, interest is a factor here as well, determining, as we have seen, the relative ease or difficulty with which the new process begins. The three classes are not, in their processes, different in this regard. They all illustrate the same fundamental characteristics of elementary psychic life. Only we should say now that they all depend upon the character and amount of interest involved in each particular case. They do not become contents until interest undergoes a development.

On what, then, does this growth of interest depend so that consciousness may become cognitive in form? We may refer most profitably to those instances in which the observer is 'bewildered.' These cases present the factors most nearly in equilibrium. There is experienced the supremacy of now one set and now another set of elements. The 'conflict' is due to the 'want of harmony' of the two. Invariably, the whole is described as a state of 'feeling.' With these facts in mind, I may refer to a case furnished me by my colleague Professor D. R. Major.[1] The connection in which it arose was in trying to ascertain at what age children make an effort to recall past experiences. The subject of the experiment was twenty-eight months old. The material used was geometrical figures of different sizes cut from card-board. "When shown the figures and asked to name them," I quote, "he had no trouble in getting the first part of the combination, *i. e.*, the 'big,' or the 'baby, but the name for the figure frequently failed to appear, and then came the phenomena referred to as an 'effort to recall.' The child when shown the card says 'biguh' and then a pause; then 'biguh' and another pause — the expression of the face

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being either like that of an adult trying to recall a name, or a street number, only not nearly so serious; or, at other times, there were grimaces, stretching the corners of the mouth far apart, showing the teeth, shutting the eyes tightly, etc. I did not keep a careful record of the matter, but I was of the opinion that the desired word rarely came in response to the 'grimace' search for it, and that as a rule it did appear when he stood perfectly still, not a muscle moving, almost suspended breathing and with mouth slightly open." In reporting the case to me verbally Professor Major said the child looked 'bewildered' before the name came, and a 'happy expression' supervened upon the successful termination of his efforts. I do not undertake to say what is the mechanism of the process of recall, but in the statement of facts, as Professor Major gives them, we have the essential phenomena of the elementary processes we are discussing. The consideration of these may throw light upon the other. In all the cases we have studied there is involved the relation of states of feeling to one another. Primarily these are æsthetic with which the comfort or discomfort of the individual is bound up. Progressive differentiation of psychic process has shown that it is under these aspects of feeling that the more clearly cognitive functions emerge. Feeling tends to an average both in kind and amount under given conditions; but in children and in these experiments where we get as near to the simplest forms as possible, it shows itself to be exceedingly unstable. It easily becomes disturbed, passing into one or other of its extremes. This may take place either immediately, as in the second class of cases, or after an appreciable interval, as in the third class. Here I think we have a clue to the phenomena in question. If it is out of our feeling of comfort or discomfort that our definitions of objective facts arise, these objective facts, at this stage of development, can come into relation only through the kinds of feeling they tend to evoke. There are then two general conditions of the life of feeling which are important for psychic differentiation. The first is where the new impulse sets up processes which generate tones of feeling in *agreement* with those already existing, thereby tending to prolong and at the same time to augment them.

Starting as we, supposedly, do from normal we fail to get beyond the immediately present; there is no perception. This is true as we have seen in the psycho-physiological and æsthetic groups. Under the second condition fall the larger number of instances. Here there is *disagreement* of the feeling processes. It may be felt merely, as one observer put it, as a 'feeling of incompleteness,' or in one of the more extreme forms as already noted. This is really the vital group, since it emphasizes the fact of difference which is characteristic of all objective process.

Turning directly to the example, we may I think ascertain the possible elements which enter into a case of bewilderment. In our own experiment there is a balancing back and forth of alternate feeling states due to different sets of elements. There was, the observer remarked 'a want of harmony between what happened and the existing impressions' the 'existing impressions' was a series of visual images. 'What happened,' of course, was light stimulation. It seems to me that in the case of the child referred to by Dr. Major the elements are quite similar. There is an ideal content — he had already named the size of the figure — and a sensuous impression — the form of the presented object. If what we have remarked above is true, in both cases the *impasse* is due to the difficulty each has in bringing the feeling process of the one into agreement with the feeling process of the other. In the case of the child the preference for the successful element of the experiment — the 'biguh' — is manifest in his willingness to let the other go. After the second or third pause he relinguished the effort with obvious pleasure by remarking —'Papa tŭll (tell).' Here evidently the remark is in order that one fails of objective knowledge unless the intractable element is reinforced by some practical consideration, and the conflict of feeling thereby maintained. In this case it is the authority of the father who returns the question with an emphatic 'No! — baby.' In the experiments, it is the observer who holds himself to it as part of an existing agreement. Both come to perception in the same way.

What is the way in which feeling returns to its normal condition? Or in other words how do we reach a true cognition? No one can doubt, I think, if he will consider the evidence,

that the most available explanatory factor is found in the large number and variety of movements connected with these elementary phenomena. It is a significant fact, as remarked above, that all the movements were connected with the effort to determine the character of the object which occasioned the disturbance of feeling. Moreover, they are most conspicuously present, and apparently play a more important part, in those cases which involve disagreement in the feeling processes. They are relatively obscure, if not entirely wanting, when there is merely a furtherance of an already existing process. Those processes which involve opposition, radical or modified, we have seen are those out of which perception arises. It would seem, then, that movements such as are present have a distinct cognitive function to serve. The large range of movements may be seen by referring to the various organs that are involved in them. A rough summary gives us the following: Eyes, legs, arms, hands, head, trunk, stomach, nostrils, front part of brain, temples, breath, whole organism. This list becomes more full of meaning when we take into account that not all the observers do the same thing with the same organ. One may, for example, take a deep breath, and another may hold the breath; one may squint with the eyes, and another jerk them wide open; the head may be moved by one, and another have a rushing of blood to the same part, etc. There are also a number of organic reactions which vary with the individual or with the same individual at different times. We note three, described by the terms contraction, relaxation, expansion. Similar phenomena were noted in the case of the child already referred to in his effort to re-cognize a presented object. The coincidence is not merely interesting; it is important as furnishing the clue to the organization of elementary psychic process. Our first sensory data come through these physiological changes which are induced through the disturbance of feeling conditions.

Can anything further be said as to the relation between feeling and the sensations accompanying the various involved movements? To generalize the expression used by Professor Major, what have our 'grimaces' to do with the way we reach knowledge? It may be said, in the first place, that they are

our feelings become objective. They are the immediately available forms of expression of the life of feeling. This will not be so difficult of comprehension when once we have rid ourselves of the false psychology which regards feeling as running its course within a closed circle beginning and ending with the gratification of its own impulses. Feeling, we are warranted in saying, exhibits, no less than conation, 'an inherent tendency to pass beyond itself and become something different.' In the second place, we may remark that these movements are what above I have called our practical attitudes. They are our primitive adjustments to what Principal Lloyd Morgan calls our 'conscious situation.' These adjustments are practical in the sense that they have survival value. This, of course, is only to say they are distinctively feeling attitudes. But, in the third place, survival in psycho-physiological organisms depends ultimately upon the principle of variation. And hence we note that our feeling life undergoes modification and growth through the reactive influence of kinæsthetic sense material originating from the physiological changes which are prompted by it. Through the method of trial and error our reactions become more successful, and these successful relations become more constant when they become reinforced by a stronger feeling-preference.

The following points sum up the results that seem to be warranted by the experimental data furnished in this paper:

1. That our most elementary psychic processes are feeling processes which are not content, but intents of consciousness.

2. That feeling process eventuates in physiological changes which involve movements of the special sense and other organs, that these movements are, on the one hand, the objective side of feeling, and, on the other, practical attitudes toward a present situation, the character of the reaction depending on the agreeableness or disagreeableness of the feeling processes.

3. That these adjustments have psychological importance because of the kinæsthetic sense material which through them become functional.

4. That with the complication of sense data there develop 'suggestions' which operate, under the guidance of feeling, as principles of its organization into definite products or perceptions.